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Rubber in the Oil Industry

D. F. Cranor[1]

THE oil industry has always been a large consumer of mechanical rubber goods often designed by composition and construction to withstand the destructive effect of constant contact with oil, steam, grit, and wear and tear of rough handling and abuse. The difficulty of compounding rubber to withstand contact with oils compares with that of producing a tire tread stock to outlast the abrasive wear of 25,000 or 30,000 miles of road travel.

Rubber chemists and technologists have utilized many resources of methods, materials, and machinery to solve the tire mileage problem. One very important factor in this solution was the discovery of the vast improvement in abrasive resistance accomplished through the remarkable energy absorption capacity imparted to rubber by carbon black. This property, together with the ability of carbon black to protect rubber from the destructive effect of oil, is destined to prove invaluable in making rubber goods virtually immune to oil.

[1]Service Control Department, Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

The oil resisting properties of rubber reenforced with carbon black may be determined readily by a simple, practical test performed by soaking rubber samples in the oil, or oil product, to which the rubber stock would be exposed in service. Even the best oil resisting stocks will swell more or less in oil. In poor compositions the oil will actually dissolve out the rubber substance and allow the stock to fall apart. In fact certain rubber lined hose for gasoline service has been known to become completely disintegrated in a surprisingly short time by the solvent action of the gasoline.

The primary factors governing quality for oil service are composition of the rubber and the state of vulcanization to which it has been cured. Even a well-compounded black rubber would not resist the solvent action of oils and gasoline, if undervulcanized. Serious overcure must also be avoided since this condition leads to cracking of the rubber and a reduction of its period of usefulness.

Studies on the composition of oil tube protector rubber indicate a proportion of fifty parts by weight of carbon black to one hundred parts of rubber substance as an optimum

National Supply Co.

Typical Rubber Goods Used in the Oil Industry

loading. Such proportion would tend to produce a stock too hard for certain rubber goods, which must be soft and pliable; but even these can advantageously include a more moderate dosage. Where a combination of oil and abrasion resistance is required, as in the harder stocks of the sheet packing type, such dosages are practicable and desirable.

With carbon black at present prices, approaching the cost level of the rubber maker's inert fillers and below the cost of red and white coloring pigments, which are also inert from the oil man's standpoint, carbon black rubber may now be specified and is available at comparable prices.

Rubber goods that require to be specially compounded for service in the oil industry comprise the following general list: power transmission belting for drilling service, packers, swab rubbers, pump sleeves, valve rings and inserts, gaskets, sheet packing, pipe joint rubbers, rotary drill hose, and hose for discharge and suction work and handling gasoline. In the case of each of these rubber products the service required or expected should outline the problem for the compounder to the exclusion of the question of cost. Quality for service should be the objective, which means study of individual products in order to proportion properly the construction of the goods and utilize the type of rubber mixing for the service. In general it may be said that rubber for oil service should have maximum tensile properties.

A maximum resistance in rubber against deterioration by oil is attained in well-cured, high-grade rubber compounded with channel-process carbon black. For resisting abrasion a composition on the order of a high-grade tire tread stock, as in the case of hose covers, packers, and swab rubbers, is required. The carbon black dosage may be raised with advantage to 50 per cent on the volume content of rubber in the mixing. In oil hose tubes a smaller yet liberal dosage of black is sufficient. A fair amount of bone glue aids the oil resistance of rubber. Resins, bituminous or tarry materials, and all oily softening materials are out of place in any rubber mixing intended for contact with oils of any kind.

The user of oil well rubber goods would do well to recognize the fact that color in rubber goods is not a criterion of quality in spite of the more or less general belief that red rubber necessarily indicates high quality. This arose from the fact that in a past era of the rubber industry antimony red rubber articles established their record of superior quality, and the ready reference was drawn that red color in rubber objectively indicated a high quality of product.

Inasmuch as carbon black compounding produces rubber stocks of outstanding physical properties, demonstrated in tire treads, conveyer belt covers, soling, and tough covers for insulated wire, it is probable that black rubber may be thought of as high grade, but this inference will be quite as unjustified on the ground of color as the similar inference is regarding red rubber.

Industrial rubber goods dealers and users are well advised that specifications for mechanical rubber should include tests for quality and tolerances and omit details of rubber composition. Thus the full resources of modern rubber technology remain available for solution of the compounding problems involved. In connection with all such problems carbon black, accelerators, and age resisters will appropriately find a place. Industrial goods for oil service in particular present the most difficult rubber problems for which no better single answer has been found than high dosages of carbon black in the rubber.

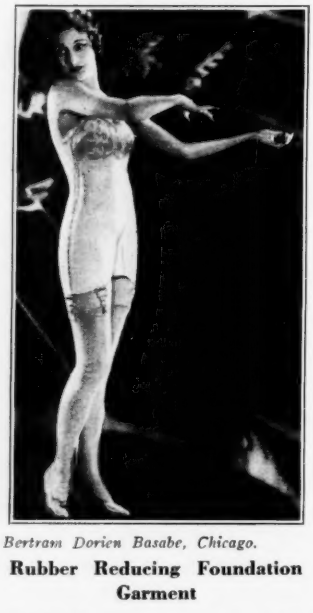
Rubber and the New Silhouette[1]

RUBBER has been used in a great many practical ways—but to women it can mean regained figure beauty.

When Paris went feminine last year, the new styles revealed that many women had been concealing a "spare tire" of flesh around the waistline, under the long-waisted chemise type of dress. Those women who wished to keep their fashion reputation became serious again about starvation diets and regular gymnasium classes; yet most of them visited a long-neglected corsetiere. Diets, however, seldom alter contours; exercise either proved boring or too strenuous; and, although foundation garments greatly improve the silhouette, they do not actually reduce figure measurements.

Once before during a reducing craze several corset manufacturers featured Para rubber garments. These proved to have many disadvantages. The Para rubber tore easily. It caused the body to perspire and felt clammy. Besides it had a disagreeable odor; nor was it particularly beautiful. Yet the undisputed fact remained that rubber foundations did succeed in decreasing milady's measurements. Scientists tell us that the human body is over 90 per cent water, and the snug fitting rubber garments induce perspiration and so break down fat cells.

Consequently in the Spring of 1930 one of the leading corset manufacturers brought out a new type of rubber reducing foundation garment that eliminated all of the former deficiencies of rubber corsets. The new rubber is made of a patented rubber texture with an outer surface of silk milanese, which gives the foundation garment a lustrous, satiny appearance, and is lined with cotton fabric that absorbs all body moisture and thus keeps the wearer comfortable.



Bertram Dorien Basabe, Chicago.

Rubber Reducing Foundation Garment

The new rubber wears exceptionally well. It boasts a "controlled-stretch" feature, which aids in reducing, and is free from the odor of rubber. The cotton lining, by absorbing all moisture, protects the wearer's skin from chafing and other discomforts. Another attribute of these corsets is that they can be laundered as often as need be to keep them fresh and dainty as new lingerie. . . . This new type rubber reducing garment is ideal in every way.

This garment is fashioned in three styles: the corset, the step-in girdle, and the combination girdle and brassiere, as shown in the illustration. The majority of these foundation garments comes in a delicate pink shade. A few appear in such pastel colors as nile green or dainty orchid, but the preference is for the flesh color. The brassiere is of exquisite lace.

Most of the slim willowy goddesses you see, who have somehow miraculously retained their girlish figures long after they would ordinarily be expected to, could (if they would) tell you that "rubber" has played the part of "the fountain of youth."

[1] Data and illustration from The H. W. Gossard Co., 108 E. Ohio St., Chicago, Ill.

RUBBER LATEX

The Development of Latex Compounds [1]

TEN years ago interest was aroused in rubber latex as a possible substitute for the rubber solutions which hitherto had been used for sealing the so-called "sanitary" can, which is used throughout the world for food products of every sort. Although during the past year over 4,500,000,000 cans were sealed with latex compounds[2], it was no easy matter and necessitated years of intensive research to develop compounds which would make a permanently effective seal and be suitable for application at speeds up to 400 per minute in high-speed automatic machinery.

As is so often the case in research, the investigations revealed ten interesting and valuable ways of manipulating latex that had no application to the can sealing field. Obviously it was necessary to make some commercial use of these other discoveries and also the accumulated experience acquired in the latex field, in order to prevent the research cost of the can sealing compounds from being prohibitive.

Fig. 1. Showing How a Can Sealing Compound Is Confined within the Can Seam

Photograph of Two-Piece Screw Cap Showing Gold Seal Cap Compound

As a result, the following widely different commodities have been developed and successfully merchandised: latex compounds for incorporation within the seams of tin cans; latex compounds for sealing glass jars or bottles; latex cements for the shoe industry; latex bonded brake linings and clutch facings; latex hair cloth cements; latex bonded fiber soles and heels.

In addition to the above diversified uses, research is being intensively conducted on other latex containing products such as battery separator plates, inner soles, and rubber filters for acids and alkalis.

Sealing glass bottles might seem at first sight to be a similar problem to sealing cans; but although glass sealing compounds (or cap compounds) are among the few products that are allied from a sales angle, they are outstandingly different from a chemical or physical viewpoint. A can sealing compound is used for producing a very thin sealing gasket which in the finished can is incorporated entirely within the bottom or top seams as illustrated in the photomicrograph, Figure 1. It serves to compensate for irregularities in the tinplate, faulty seaming practices, etc.; and theoretically if a perfect double seam were obtainable, its use would not be essential. A cap compound, on the other hand, must provide a heavy sealing gasket or cushion as shown in Figure 2. A glance at the illustrations makes evident the difference in sealing functions of the two classes of compound, and it is further evident that in the case of cap compounds the compound inevitably comes into more or less direct contact with the contents of the jar.

Compounds must be made, therefore, with high solids to give a heavy film and yet be of suitable consistency to permit rapid application in automatic machines; the resultant film must be resilient and deformable so as to insure a permanently tight seal even in the face of irregularities in the glass finish; compounds must be provided which will resist attack by whatever the container is to hold, whether oily or aqueous; the aging properties must be exceptionally good; and above all there must be no trace of taste or odor to contaminate the most susceptible product.

The idea of rubber latex as a basis for shoe cements to replace the usual inflammable and toxic solvent cements was conceived almost as soon as the idea for can sealing compounds, but equally great technical difficulties presented themselves for all except the simplest cementing operations. In some cases, cements could be prepared for use in existing machines; in other cases it was necessary to modify the machines. In almost all cases ingenious compounding was required to impart "tack" and to adjust the speed of drying to meet the requirements of each cementing operation. The complexity of the problem is shown by the fact that more than a hundred numbers have been developed to care for the individual needs of the shoe industry. That the research was economically justi-

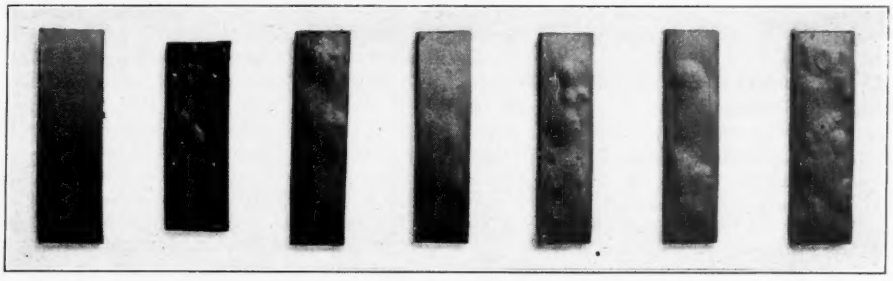


Fig. 3. Seven Commercial Molded Brake Linings after Exposure to 600° F. for Three Hours—Multibestos Latex Bonded Lining Is at Extreme Left

[1] Data and illustrations from Dewey & Almy Chemical Co., Cambridge, Mass.

[2] "Rubber Latex Compounds for Sealing Food Tins." INDIA RUBBER WORLD, Dec. 1, 1926, pp. 135-137.

fied is also shown by the increase in the use of latex shoe cements from zero 5 years ago to an estimated volume of $750,000 in 1930.

Rubberized asbestos brake linings and clutch facings for the automotive trade are not new, but their use of solvent rubber subjects them to certain inherent disadvantages. Requiring a relatively high proportion of binder, they frequently "bleed" and become "grabby" at elevated temperatures, and they are apt to get excessively brittle with age. Also, they often develop blisters or fissures under the heat test of 3 hours at 600° F., owing perhaps in part to residual traces of solvent. A latex impregnation process, however, has been developed whereby either flexible or rigid molded linings are produced, which are exceptionally stable and long wearing. They have no tendency to bleed and will not swell under any driving conditions. This development is of far reaching importance because the present trend of the automotive industry towards internal expanding brakes is forcing the use of molded linings.

It is interesting to note that whereas most manufacturers still recommend the use of woven linings in preference to molded for external brakes, latex bonded molded linings have been used with exceptionally satisfactory results on both types.

The field for hair cloth cements is not a large one, but latex cements for this purpose have been a blessing to many manufacturers not so much because of their non-toxicity as because of their freedom from fire hazard. The research problems here involved are similar to some of the shoe cement problems, but in this case a vulcanizing cement is required to give the firm bond which is so much desired.

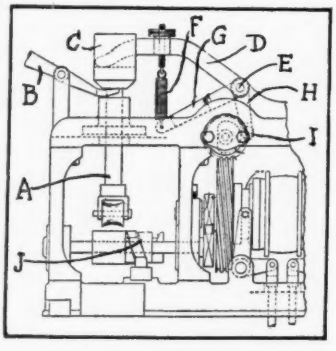
Quite a different product utilizing latex is the bonded fiber sole, Darex, which is made by impregnating felt with a latex compound, after which it is vulcanized and compressed to a small fraction of its original thickness. Although the finished sole contains about 75 per cent of rubber, the sole has neither a rubbery look nor feel, and it is free from the objections often voiced against rubber or composition soles. Felt is well known to be an exceptional insulator against heat or cold, and tests have confirmed that these soles are better insulators than rubber or even leather and, consequently, are more comfortable on either hot or cold pavements. This is, of course, apart from the comfort due to their being materially lighter in weight for a given thickness. They are completely waterproof; they will not slip on wet pavements, or on a golf course, whether it be sun baked or soaked with rain. The reason for this is that the felt fibers provide a continual gripping surface as the sole wears down, and yet—paradoxical as it may sound—it is possible to dance on them.

These soles wear comparably to the better grades of leather, and keep their shape without warping, spreading, or deteriorating with age or exposure. Another interesting feature is that none of the soles will mark woodwork because the black and brown varieties start with a suitably dyed felt. It may be added that a non-slip sole is obviously of little use without an accompanying non-slip heel, and so the fiber heel has also made its appearance. This is a molded heel made from the sole scrap; and although the molding operation sacrifices some of the insulating properties of the heel, it still maintains the important non-slip feature.

Golf Ball Winder

GREAT ingenuity has been displayed in the invention and the perfection of machines for winding rubber thread on golf ball centers. It is essential that such centers be wound with utmost accuracy and with the thread under definite tension to secure the requisite resiliency.

One of the recently patented machines for this purpose is of English origin.[1] It is of the type wherein the ball core is pressed against rotated rollers, which are reciprocated endwise. The presser carries one or more idle rollers having fluctuating spring pressure intermittently applied to the presser.



Morris Winder

In the illustration the presser shaft *A*, provided with a hand lever *B* for raising it, has a weight *C* at its upper end. On this rests an arm *D* freely mounted on a spindle *E*. An adjustable tension spring *F* is attached from the under side of the arm *D* to the arm *G*. The latter is pivoted at the point *E*, as also is another arm *H* carrying a roller *I*. This roller engages the high part of a cam driven by a worm wheel and gear on the main driving spindle of the machine.

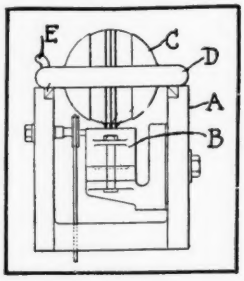
The lower winding rollers are rotated from the main driving spindle through spur gearing and reciprocated by cam grooves *J*. A pedal operated clutch is connected to operate the machine, which is electrically driven.

[1] British Patent No. 329,798, July 16, 1930.

Ball Striping Machine

IT IS customary to ornament inflated hollow rubber balls with stripes of paint applied by a hand brush to the ball, which is adjusted on top of a spindle that is hand rotated by the operator. The hand painting method is generally used on foreign balls.

A machine to supersede slow methods of that kind has recently been patented.[1] By its use one or more lines of color can be applied to balls by rotating them against rotating color applying disks. The device is characterized by a number of painting stages and means for moving the balls continuously between and into selective contact with the painting disks.



Dunlop Ball Striper

The apparatus comprises a trough member *A* supporting paint containers *B* into which dip the paint applying disks. The balls are rotatably held between cup shaped holders *C* carried by a slide *D*. This slide forms a movable top to the trough *A*. The ball holding cups *C* are mounted so as to slide together and clamp the balls. Also the balls held in the clamp may be raised clear of any particular color disk by raising the handle *E*. The cups *C* may be of such size as to protect the parts of the ball not being striped. Construction of the machine may be varied to accommodate different sizes.

This device is evidently one with which balls may be quickly and accurately striped with colored paints far more economically than by hand brush. Further details may be obtained from the patent specifications.

[1] British Patent No. 330,365, July 30, 1930.

Short-Cuts in the Rubber Laboratory

Harlan A. Depew[1]

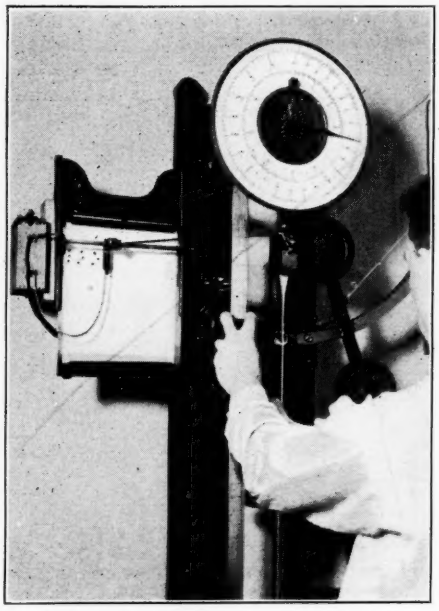


Fig. 1. Making a Tension Test

IN MOST laboratories the method of obtaining stress-strain data on rubber compounds consists in stretching dumbbell test pieces on a tensile testing machine as shown in Figure 1. At the beginning of the test the jump spark device makes a tiny hole in the sheet of paper on the left-hand side of the machine, near the left-hand border of the paper that corresponds to zero load. When the elongation reaches a suitable extent, such as 300 per cent, the operator makes electric contact, and a second hole is burned in the same horizontal line as the first hole at a distance from it that is measured by the force on the rubber test piece. In the same way the load at other strains, such as the 450 per cent elongation point, and the load at break are recorded.

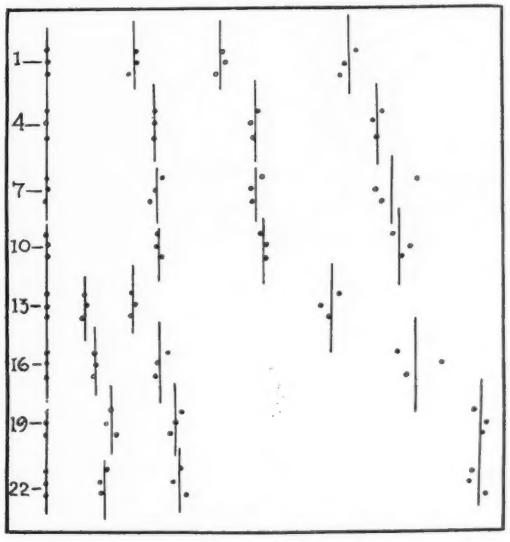


Fig. 2. Jump Spark Record

[1]Research Division, The New Jersey Zinc Co. (of Pa.), Palmerton, Pa.

2m-5-29
DATE MILLED 2-10-30
DATE CURED 2-13-30 & 2-14-30
DATE TESTED 2/19/30.

WORK SHEET
RUBBER TESTING DATA

OPERATOR [signature]
CHECKED BY Kennedy
DATE CHECKED 2-17-30

TEST NUMBER	TIME OF CURE @ 40.1	SPECIMEN NUMBER	THICKNESS	AVERAGE THICKNESS	AVE. LOAD IN LBS. AT 300% ELONG.	AVERAGE LOAD IN LBS. SQ. IN AT 300% ELONG.	AVERAGE LOAD IN LBS. AT 450% ELONG.	AVERAGE LOAD IN LBS. SQ. IN AT 450% ELONG.	AVERAGE LOAD IN LBS. AT BREAK (CHART)	AVERAGE LOAD IN LBS. SQ. IN. AT BREAK (CHART)	LOAD AT BREAK IN LBS. (DIAL)	% ELONGATION	AVERAGE % ELONGATION	COLOR	REMARKS
49652	30	1	.107								54	610			
		2	.105	.105	16	610	32	1220	53	2020	52	600	605		
		3	.104								51	610			
	45	4	.109								58	590			
		5	.104	.107	20	745	38	1420	58	2160	57	590	595		
		6	.107								53	600			
	60	7	.109								64	600			
		8	.105	107	20	745	38	1420	60	2240	57	590	595		
		9	.106								58	600			
	75	10	.109								60	590			
		11	.107	.107	20	745	39	1460	62	2320	63	610	605		
		12	.104								61	610			

Fig. 3. Rubber Testing Data Work Sheet

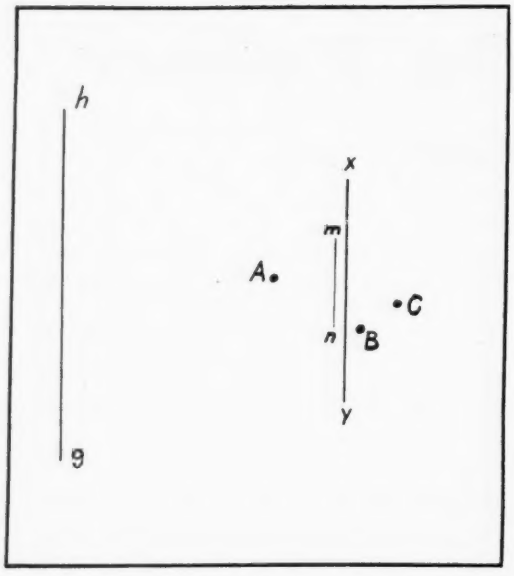


Fig. 4. Method of Averaging Three Points Graphically

The chart is then moved upward for a quarter of an inch, and another record is obtained directly below the first. A typical record is shown in Figure 2 with three tests from each test slab. The distances from the zero point on the left to each of the other points are determined; the loads at the various elongations are calculated and the three values for each elongation averaged.

Graphical Method of Averaging Stress-Strain Data

In the method here described, which has been used in our laboratories for nearly five years, this average is determined graphically, and by this means the work of calculation reduced by two-thirds. Figure 2 illustrates this graphical method. The three points representing the loads at 300 per cent are averaged graphically by a vertical line, and the distance from this line to the base line at the left measures the average load in pounds per square inch directly. The work sheet corresponding to the jump spark record in Figure 2 is shown in Figure 3.

It is necessary to average the thickness arithmetically unless a tensile machine with a compensating thickness device is used. It is also necessary to average the elongations arithmetically. The average load in pounds at break as taken from the chart can be checked against the load at break as taken from the dial. It is a matter of comparatively short experience for an operator to be able to compare the three spark records with the thickness and to estimate whether he is within the required laboratory accuracy. In case he is not, he breaks a fourth test piece and crosses off the series of dots in which he is not interested.

Figure 4 illustrates how the graphical average distance of three points from a line can be determined. First, a vertical line *mn* is drawn parallel to *hg* and midway between *A* and *C*, the extreme points. The line *xy*, then drawn midway between the line *mn* and the point *B*, is the approximate graphical average of the three points, and the distance of *xy* from *hg* is the average distance of the three points from *hg*.

In order to simplify measuring the distances in Figure 2, a celluloid photographic scale has been devised and arranged in a box as shown in Figure 5. The scale is illuminated by light from an electric bulb within the box, and the light passes through an amber glass that makes it softer and easier for reading. The glass cover of the box is raised; then the thin sheet of typewriter paper containing the jump spark record is placed over the celluloid scale and the glass closed over it. The scale can be seen clearly through the thin paper and the loads for the several elongations can be read directly. In addition to transparency thin paper has the advantage of interposing less resistance to the passage of the spark and thereby reducing any displacement of the burned hole to a minimum.

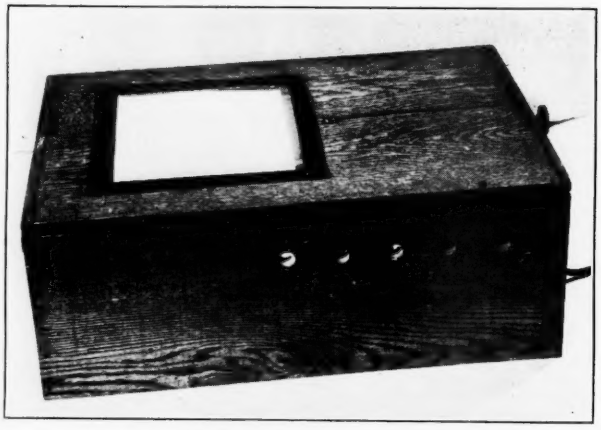


Fig. 5. Box with Illuminated Celluloid Scale Over Which Jump Spark Record Is Placed to Read Loads at Several Elongations

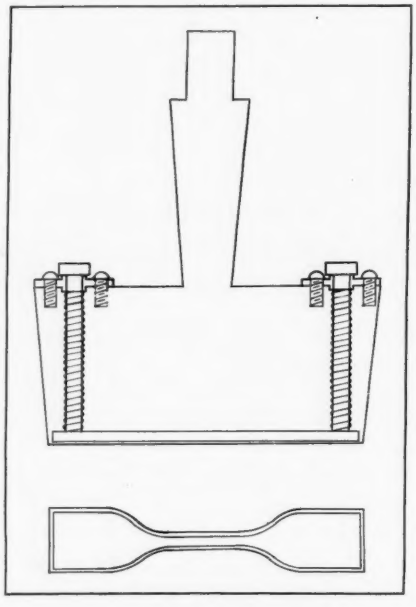


Fig. 6. Sketch of Die Showing Automatic Test Piece Ejector

Arbor Press for Dieing Out Test Pieces

The method of dieing out the test pieces has no direct connection with the graphical method that has been described, but it is an important part of the testing procedure. The test pieces are cut by the die in a pedal operated arbor press, with a quick foot motion. The cut surfaces are straighter and more uniform than if they were cut with a mallet. The method is rapid and is speeded up by means of an ejector, shown in Figure 6, with a moderately weak spring that kicks the test piece out of the die.

The author wishes to acknowledge the assistance of E. G. Snyder in helping to work out the details of this testing method.

Sulphur Consumption Rises

The rubber industry, it is estimated, consumed about 35,000 tons of sulphur in 1927, 40,000 in 1928, and 43,000 in 1929.

Measuring the Winds Aloft

L. T. Samuels[1]

THE great increase in the amount of flying throughout the world has brought a correspondingly increased demand for a knowledge of upper-air conditions. Most important in this connection are observations of the wind at various elevations above ground. It is a well-known fact that both the wind direction and the velocity are ordinarily not the same at higher altitudes as at the earth's surface. This fact is obvious from clouds which often can be seen to be moving diametrically opposite to and at different speeds from the surface wind. Also, distinct cloud layers frequently show a marked difference in their movements with respect to one another.

Since an airplane is aided or retarded by "tail" or "head winds," respectively, it behooves a pilot to fly in the former whenever possible except, of course, when taking off or landing, both of which are always done in "head winds."

The United States Weather Bureau determines the free-air wind conditions principally by means of pilot balloons. These balloons are made of an exceptionally good quality of pure rubber. They are inflated with hydrogen gas from an initial diameter of 6 inches to approximately 24 inches.

Fig. 2. Observing Pilot Balloon through Theodolite. Note Telephone Attached to Observer for Transmitting Angle Readings to Computer Inside Office

The exact amount of gas used in a particular balloon is such that a definite "free-lift" is obtained, since the latter determines the rate at which the balloon will rise. This inflation is accomplished by a specially adapted balance, which is shown in Figure 1. The observer simply sets the rider on the scale bar to balance the weight of the uninflated balloon. A definite weight is then placed on the pan with the balloon, and the gas is turned on. When the proper amount of gas has entered the balloon, the scale pans balance each other. The balloon is then slipped off the nozzle, and the neck twisted and fastened with rubber bands.

It has been found from a large number of two-theodolite observations of pilot balloons that they rise at a practically uniform rate, at least to heights of about 8 miles. In view of this fact it is possible to observe such balloons through a single theodolite and from the elevation and azimuth angles, as read each minute, the wind direction and the velocity can readily be determined. It is obvious from plane trigonometry that when the height of the balloon is known, as it is at the end of each minute, its horizontal distance is a function of the elevation angle and the height.

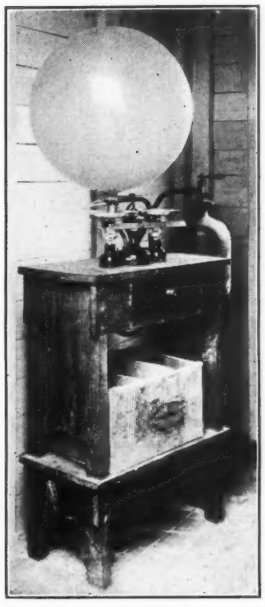


Fig. 1. Special Inflation Balance for Inflating Pilot Balloons with Hydrogen Gas

In practice the elevation and azimuth angles are read each minute by the observer at the theodolite. These angles are telephoned, as they are read, to a man inside the building, as shown in Figures 2 and 3. The man on the inside records the angles and computes the horizontal distance of the balloon for each minute. These latter values are plotted with the corresponding azimuth angles on a specially constructed protractor, and with the aid of a measuring scale the wind velocities and the directions for each successive minute are determined. All of these computations are carried out concurrently with the ascent of the balloon so that by the time the latter is lost to view, the wind data have been determined for all intermediate elevations.

Fig. 3. Computer at Plotting Board in Telephonic Communication with Observer Outside

Certain colors of balloons are used for certain types of sky backgrounds because of their visibility characteristics. For example when dark clouds prevail, a black balloon can be seen best; whereas at times of high whitish clouds a red balloon is most easily seen. Uncolored balloons are best seen against a cloudless sky.

These balloons rise until they burst. Pilot balloon ob-

[1] United States Weather Bureau, Washington, D. C.

servations frequently extend to heights of more than 8 miles and to horizontal distances of more than 15 miles. The rate of ascent of the balloons used by the United States Weather Bureau is 590 feet per minute.

When clouds are low (less than 1,000 feet) and pilot balloons would therefore soon be lost to view, a smaller and less expensive type, known as a "ceiling balloon," is used. These are initially about 4 inches in diameter and are inflated to about 18 inches. They rise at approximately 360 feet per minute and are timed until they enter the cloud base. Since they are only used when clouds are low they are followed with the naked eye instead of with a theodolite.

The Weather Bureau makes from two to four pilot balloon observations daily at 57 stations in the United States. These data are promptly transmitted to forecast centers where they are used in making the regular daily forecasts and the special flying forecasts. The data are also compiled statistically and used in special studies of the upper air.

Engineering Operations

Specializing the Tire Industry

J. G. Bulger

IN THIS age of mass production the details of every industry must be specialized, and manufacturing operations of like nature should be grouped together for efficiency and economy. Only when the supervising staff and the operators assume the attitude of specialists, can the manufacturing operations be performed to common advantage. The application of specialized processes and machines in the rubber industry is best illustrated by the tire division wherein post-war competition is endeavoring to keep in production the expanded facilities installed for war needs. This situation has caused a period of intense development that will ultimately culminate in some definite industrial policies.

Recently various phases of certain methods of tire manufacture have passed. Conveyers have come and gone, but have returned again with greater benefit. The question of "work flow" has received attention; yet it is not agreed whether work should flow across or down a production department, though this procedure depends on the production. Owing to the nature of the material used, there has been disagreement as between hand versus machine manufacture. This fight will continue, and in many cases, particularly in small tires and rubber goods, hand methods will maintain their position. Machines have been developed to show a saving in direct labor, but when the true cost including maintenance, power, space, depreciation, and interest, is figured, the net result does not prove all that might be desired. Flat methods of tire manufacture have been developed, but conflicting opinions exist among technicians as to which sizes should be made flat and which should be core built. Out of it all it is difficult to form fixed conclusions, and one wonders if there ever will be any conclusion. With changing industrial conditions, development will continue.

One aspect of factory organization, however, may be considered with a view to forming some real opinion. One factory may use a self-contained unit from compounding to finishing of one product; while in another factory only partially self-contained units are used. Again, the grouping of operations may be carried out in one department, or the same operations may be carried out in different sections of the factory. More frequently there is to be seen that curious stage of transition and development that never seems complete; in fact it may often be considered something of a muddle.

The self-contained manufacturing unit has certain advantages, but most probably the cost disadvantages are greater. In planning a balanced unit the equipment of the department often calls for fractions of machines. This case is frequent with large machines having a high capacity, such as forcing machines, calenders, and bias cutters. These fractions occur in all departments or units, so that it becomes necessary to have more plant than is absolutely essential, even allowing an economic margin of safety. Another serious disadvantage is having the same machines and operations in several departments. This divides the control so that staff and workers are not used to the best advantage, nor are they in a favorable position to develop improvements. Where all similar operations are grouped under one staff manager, interest is strengthened and developments follow that reduce the cost of production and possibly increase the quality of the product.

Many engineering organizations make a strong distinction between manufacture and assembly. Machining the component parts is kept quite separate from the assembly line. This is a policy that might be adopted by the rubber industry, with advantage. The compounding room should be the hub from which all other manufacturing departments should radiate. It should produce the compounds in a form ready for assembly; i.e., as profiled treads, calendered strip, etc. Such organization will lead immediately to a more economic production and will reduce the floating stock. Direct working will develop cutting out that period which elapses between mixing and extruding, with the consequent saving of stocks, plant, space, and overhead charges. The finished components should be stocked by sizes in a detail assembly room, where all component parts meet and are assembled on stillages in sets ready for the assembly.

In the case of cord fabric, processing is parallel to compounding up to the stage where the mixed rubber meets the fabric; hence the two departments may be kept separate, but will run in parallel. The milled compound may go straight from the mixing mill to the stock room and thence to the calender. Owing to the rate of processing the cord, it is not possible to make bias cutting part of a continuous set of operations. The processed cord must go into stock prior to bias cutting. The cord, however, should be cut into suitable strips on the bias cutter, and sent to the detail assembly room to meet the other component parts, being assembled in sets.

The component parts may pass to the assembly room in stillages or on conveyers. The latter save much handling and space. On the other hand, where numerous sizes are being assembled, there is the dangerous possibility of components becoming mixed. In practically all cases it will be found that conveyers are the most satisfactory method of transporting the assembled product to the press department.

Molding is an operation that certainly should be under single control; the plant is very expensive and consequently must be used to the best advantage. Proper control and recording of cure is essential. Grouping all curing vessels leads to steam economy, because the exhaust steam from high temperature may be utilized for work at a lower temperature, before being used for the heating of the factory.

The many problems in rubber manufacture offer a broad field for the technologist and chemical engineer to develop the economies of mass production.

Dry Heat Vulcanizer

Effective and Rapid Heater for Air-Curing Fabrics

O. M. Ragsdale[1]

THE Carrier dry heat vulcanizer is an adaptation of the standard Carrier ejector drier. It is designed to operate at temperatures considerably higher than those maintained in an ordinary ejector drier. In present practice a good portion of dry heat vulcanizing takes place at about 240° F., but there is a tendency to step up the cure; therefore 260° to 270° F. will probably be the range in the future.

Special accelerators are used in connection with dry heat vulcanizing; and the rapidity with which they act, renders it imperative that uniform temperature conditions be maintained within the heater box. If a cure is held too long, or if the temperature is too high, the material will be overcured and so result in injury to the rubber and wearing qualities. The damaging effect of overcuring is virtually the same as undercuring. There seems to be no way to judge the cure other than by aging tests. Thus, if the temperature in the box runs higher at the top than at the bottom, the stock will variably cure.

When the sheets are cut for bath curtains, some parts will give way before others. When, however, curing takes place at a uniform temperature, the durability of the curtains will not only be greater, but they will wear uniformly in all parts.

Since no specific test can be applied to the goods other than aging, it is necessary to regulate the heater temperature during the cure. This can be done in the heater here pictured and the heat maintained within three degrees plus or minus any place within the box.

The material which is to be dry heat vulcanized consists of thin rubberized fabrics, such as hospital sheetings, bath curtains, etc. The material is hung in festoons, as shown in Figure 1 and the effect of a continuous conveyer is obtained by the method of loading on a series of poles laid on a carrier. The material is hung on the poles, and the loaded carrier, which is on rails supported from the ceiling, is pushed into the heater box. The nature of the material determines the length of time it is necessary to effect the cure. In the case of hospital sheetings a given length of time is taken for the box to come up to curing heat. The temperature is held for a predetermined curing period. The box is then opened, and the material and the carrier are run out on the track at the opposite end to which the material was loaded.

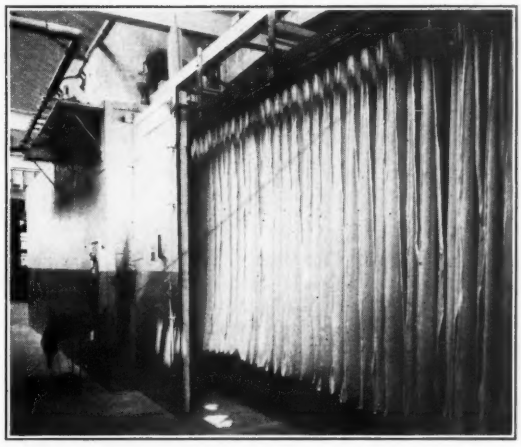


Fig. 1. Festooned Fabric Entering the Heater

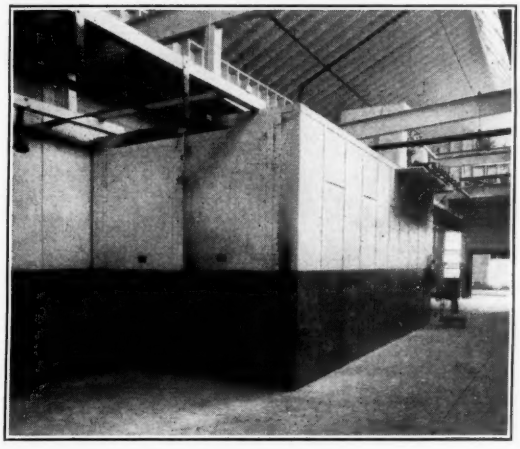


Fig. 2. Heater Closed

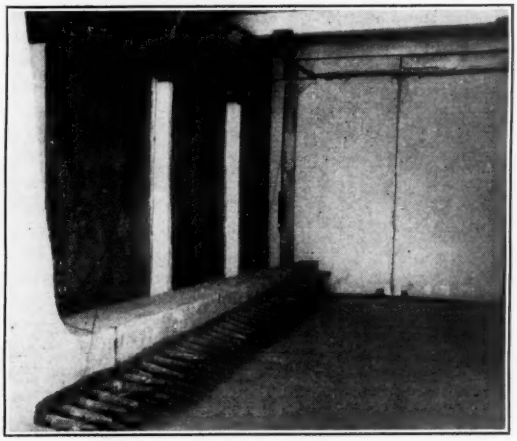


Fig. 3. Interior of Heater

While this cure is taking place, a second rack is loaded, which in turn is run into the heater box as soon as the preceding cure is effected, and the performance is repeated. In this manner two men are able to load and unload the heater without loss of time between cures.

The dimensions of the heater, the exterior of which is shown in Figure 2, and the interior in Figure 3 are length 30 feet, width 12 feet, and height 12 feet. The material cured is of such a width as to permit two rows of 36-inch material being hung in one load amounting to approximately 600 yards per cure.

The principle and the operating details of this heater are simple. No steam is injected into the heater but is used under thermostatic control solely for heating the air that circulates in the heater. The pipes seen in Figure 3 are injector nozzles.

The air is drawn into the main duct and distributed through these nozzles. The air passes under the festooned material and, is drawn out through return dampers located in the top of the heater. It is very essential that blasts of air be eliminated during a cure in order to avoid movement of the festoons that might cause them to adhere and damage the goods.

[1]Manager, Standard Products Division, Carrier Engineering Corp., Newark, N. J.

Reducing Rubber Shop Risks

Industrial Experts Discuss Means for Minimizing Factory Casualties — Frequency Rate Drops but Severity Rises

THE announcement by the Rubber Section of the National Safety Council that during the years 1927, 1928, and 1929, while the frequency rate of accidents for the American rubber manufacturing industry had dropped from 30.84 to 20.15, the severity rate had meanwhile risen from 1.00 to 1.29, is likely to result in more energetic measures being taken soon to lessen considerably both serious and minor injuries to employes. In all industries, it is stated, while the reduction in frequency for the same three-year period was from 25.85 to 22.90 (or but 11 per cent as compared with the 35 per cent made by the rubber industry), the severity rise for all industries was but 5 per cent as contrasted with the 29 per cent made in the rubber industry.

In the 29 per cent increase were represented all three classes of time losses, such as fatalities, permanent partial disabilities, and time lost from temporary total disability. While fatal accidents in rubber working were limited to one among 5,183 employes compared with one to every 1,888 in all industries, permanent partial disability, however, occurred once among every 937 in the rubber industry as compared with 430 in all industries. The reduction in the frequency rate in the rubber industry in 1929 now places it ninth in the twenty-seven groups in "Industrial Accident Statistics."

The National Safety Council credits The B. F. Goodrich Co. with a striking gain recently in casualty lessening, for its tire division worked a total of 750,000 hours without one lost-time accident; and the Corduroy Tire Co. in like manner is reported to have run 697,183 hours from September 13, 1929, to September 13, 1930. Many other rubber concerns are now said to be striving eagerly to equal or surpass such encouraging records.

That safety measures help dividends and are conducive to the comfort and well-being of employes is the experience of a large group of companies. It is said that they have found that a substantial decrease in accident rates is obtainable coincidently with an increase in the production rate. In other words, the trend to maximum productivity has been found to bear a distinctly favorably relation to that of minimum accident occurrence; and in an increasing degree are manufacturers devoting more time and money to installing and maintaining sound safety programs in their plants.

One of the greatest problems in rubber plants, according to C. B. Mitchella, chairman of the Engineering Committee, Rubber Section, National Safety Council, has been the prevention of accidents on rubber washing machines. Realizing that almost any piece of equipment placed close to the rolls to protect the operator makes it difficult to feed rubber into the rolls, he has adopted the practice of raising the usual height of the rolls above the floor and providing means—as a cross-bar between the housings—for keeping the operator far enough away from the bite of the rolls to make it quite unlikely for him to get caught unless he deliberately leans or crawls into a hazardous position. Such a bar can be set so high that a man may safely rest his body against it.

Where force may be needed to get rubber between the rolls, Mr. Mitchella advises setting the cross-bar slightly higher than the top of the rolls and placing underneath the bar a wide board. With such arrangement the rubber can be pried down to the bite of the rolls by means of a paddle inserted above the board; the paddle acts as a lever, and the cross-bar as a fulcrum. On some mills a metal leaf is suspended by its upper edge above the near roll to restrain the operator from pushing his hands too far. He regards this device as excellent in the washing of sheet rubber, but considers it rather in the way in feeding in chunks of biscuit. Nor does he think that it would serve well on a mixing mill or a warmer where the stock is rolled up and allowed to fall over the top of a mill roll. Much must yet be done, he says, before the washing, warming, and mixing of rubber can be said to be performed with maximum safety and efficiency.

Falling material caused about one-fifth (19.9 per cent) of the total number of accidents in The Goodyear Tire & Rubber Co. works, Akron, O., since January 1, 1930, according to W. H. Flemming, superintendent of production, Plant II. Such material slips, topples, or is pushed by careless operatives from tables, benches, machines, or ladders; or faulty piling of stock, etc., often disregarding shop vibration, may result in injuries. Carelessness in the loading, unloading, and transportation of materials and machines accounted for 9.77 per cent. Other causes were: taking needless chances while operating tire and other machines, 8.32; falls of all kinds, 8.08; careless operation of trucks, 7.6; excessive or faulty load-lifting, 7.11; misuse and neglect of tools, 7.9; miscellaneous effects, 6.9; eye accidents, commonly due to neglect in using provided goggles, 6.63; neglected minor injuries, 5.79; absent-mindedness, 4.58; rolling and mishandling tire and other molds, 2.77; burns, 2.53; mill and calender hurts, 1.68; stumbling over material, etc., 1.32; presses, .02 per cent.

It is contended that foremen can prevent a great many accidents. While 15 per cent of them are due to mechanical causes, 85 per cent can be attributed to heedlessness. Herein, it is held, lies the duty of foremen, as well as their opportunity. By maintaining clean, orderly shops, properly educating those in their charge, and exercising intelligent discipline they might readily better conditions for all concerned.

One large company which intrusts its accident elimination work to a safety director authorizes him to hold monthly meetings of the employes; and at such gatherings views are freely exchanged, often hidden hazards revealed, and valuable suggestions received from the workers. Use is made too of attractive bulletins that are neither scary nor preachy, and the company's house paper regularly carries a clever safety message. For psychological as well as sanitary reasons, the working quarters, washrooms, etc., are kept as tidy as a Dutch kitchen. Fire drills take place twice a month, and fire hose and extinguishers are inspected every month. The tactful safety director enjoys the good will, confidence, and steady cooperation of the entire working force.

Trophies at moderate cost occasion lively rivalry and generally bring satisfactory results. Sometimes the reward offered also brings an odd surprise. A free dinner was promised to the men of any department that worked for three months without an accident. At the end of the quarter it turned out that not one but every department had won the prize. The manager of the works cafeteria begged the management to try a different prize next time as the entire force had fairly eaten him out of house and home.

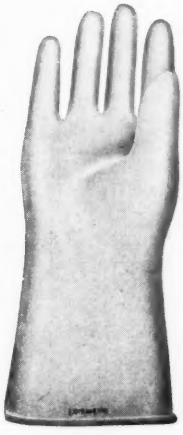
Rubber Glove Standards Rise

Attractive Design, High Quality, Refinements in Manufacture Win Lead for American Products in World Markets — Steam-Curing as Safety and Service Factor

DESPITE much competition from European manufacturers, American-made rubber gloves still maintain their lead in foreign as well as domestic markets. Holding first place among exporters of rubber gloves, the United States in 1929 made a gain of 23 per per cent in value over 1928, sending 125,599 dozen pairs valued at $335,551 to 68 foreign markets. Indicating that in 1930 exports will exceed all preceding years is the fact that while 45,000 dozen were sent abroad in the first five months of 1929, 56,000 dozen were exported for a similar period in 1930. American glove manufacturers are even holding their own in the United Kingdom, Germany, France, and Denmark, from which comes much competition.

Wilson Obstetrical Glove

Both at home and abroad insistence on quality steadily is growing among purchasers, and American manufacturers, heeding such urge and eager to retain their renown for superior craftsmanship, are continually seeking ways and means to better, if possible, products seemingly quite perfect. Safety, for instance, a factor of paramount importance in electric linemen's gloves, used to be regarded as fully achieved when gloves withstood a high potential test of from 8,000 to 10,000 volts for one minute. Now, as in the case of one prominent rubber company's Class A products, before leaving the factory gloves are subjected to 15,000 volts for one minute and 10,000 volts for three minutes, and leakage must not exceed 18 milliamperes.



Seamless Linemen's Glove

Merits That Buyers Seek

Quality implies many things with buyers. While there will always be a considerable market for goods on a price rather than a quality basis, rubber manufacturers note a substantial increase in the demand for goods of the better sort, for gloves that are practically flawless in material and workmanship, that will not deteriorate within a reasonable time under ordinary climatic conditions, nor wear too soon in usual service, and that are thoroughly impermeable to fluids which they should easily withstand. In one case at least their requirements are best met with what in this machine age may seem anomalous—hand-made gloves, a line that was pioneered in this country in 1846. Indeed for many purposes hand-made gloves can not be surpassed.

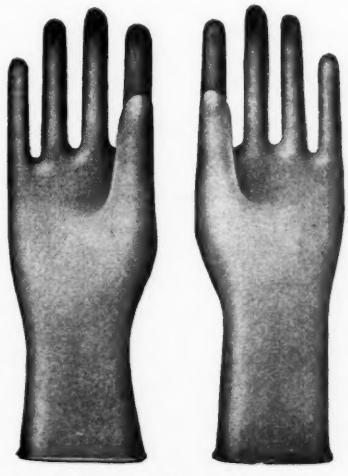
An outstanding type of the hand-made class is the acid glove used in a great variety of chemical and other industries. Such gloves are made from a specially compounded acid and alkali resisting white sheeted rubber stock, cut out in much the same manner as leather gloves are died from a trank to provide a pattern which, when folded over on itself, will cover both palm and back of a hand as well as sheathe the fingers. The sides and the edges are well cemented and a thumb section attached. Fingers, thumbs, and palms are reenforced in the better makes, and for long types net-lined or unlined 5- or 7-inch gauntlets are added. Seams are rolled, lapped, and strapped. Weights are "regular" and "heavy." In the short or wrist-length gloves the weights are commonly light, and net lining is much used.

Wilson Tanners' Mitten

Finer Hand-Made Gloves

Also in the hand-made class are fine tan and white gloves for men and women, net-lined, of medium weight, and in sizes ranging from 7 to 15. In the larger sizes palms and thumbs are reinforced where wear and strain are greatest, and gauntlets are added. A special type is surgeons' gloves with 5-inch gauntlets. These also are hand-made, quite light or fairly heavy, and in sizes designed for women and men. The material is pure gum, and the gloves can stand repeated sterilizing. They are used extensively for dissecting, post-mortem, hospital, and light chemical experiment work.

Hand-made, too, are short rubber mittens made of pure gum, unlined, black wool-lined, heavy, and extra heavy black net-lined. Long-type mittens include white acid mittens with 9-inch gauntlets, and those with 5-inch gauntlets, comprising pure gum unlined, heavy and extra heavy black net-lined, and white acid net-lined with and without reenforcements in palms, thumbs, and fingers. All mitten sizes are 15, unless otherwise ordered.



U. S. Rubber Household Gloves

Steam Preferred for Curing

When the hand-made gloves and mittens are assembled on the hollow metal forms, they are placed in a curing chamber, and steam under very high pressure is forced into the interior of the forms as well as being applied outside. The rubber hand coverings thus thoroughly vulcanized are said to have a much longer life in use or in stock, are much better finished than those produced in a cheaper curing process, and are impervious to the maximum.

Steam-curing, which is preferred by certain companies, is also used for vari-

ous types of dipped or seamless gloves for household use, factory operations, and for electric linemen. In the case of linemen's gloves especially it is claimed to afford a better margin of safety than the older acid cure, and rubber thus cured is said to reveal more accurately possible deterioration than acid-cured stock in the customary weekly tests of linemen's gloves in service, thus even averting a possible casualty. It is also said that gloves cured in live steam are slower in "dying" than those cured in acid solution or vapor, and not only remain soft while acid-cured gloves become brittle at high temperatures, but continue very pliable even down to 30° F. below zero. The durability of steam-cured gloves is attested by the fact that many large users have had them in hard service even eight years.

Hand-Made **Dipped**

U. S. Rubber Acid Gloves

Seamless Tanners' Mitten

Types of Dipped Gloves

The dipped class includes medium and heavy maroon-colored household gloves, also intended for hard service in hotels, institutions, and various industrial work such as canning and packing, undertaking, and photo-engraving. Heavy dipped acid gloves are usually 12 and 14 inches long. A shorter type for mechanical, storage battery, and light chemical work is of lightweight, featherweight, and extra lightweight. It is a very popular number.

Linemen's gloves, seamless and reversible, are also in the dipped class, and in no other kind of gloves are the specifications more exacting. They, too, are maroon-colored, very flexible and tough, and like the other dipped products are steam-cured, especially to insure safety. Those that are 14 inches long are designed for use without leather protectors. They meet most exacting tests for electrical hazards. Before leaving the factory they are tested for 15,000 volts. Gloves tested for 10,000 volts come in 14-inch lengths. They are intended for use with leather protectors and are adapted to a wide range of service in the electrical industries. As an additional safeguard for linemen whose arms are likely to come into contact with live wires, special red rubber sleeves are made in 24-inch lengths and tested to 10,000 volts.

Wilson Autopsy Gloves

"Safety First" the Slogan

Extreme precautions are taken in the manufacture of linemen's gloves to guard against every possible danger to the users. The cement or solution of compounded rubber into which the glove forms are dipped is made of crude rubber of the finest quality, which has been milled and washed thoroughly in order to remove all dirt, splinters, and soluble substances that might possibly impair the dielectric quality of the final product. A special grade of high quality solvent is used for dissolving the rubber after it has been compounded with chemically pure ingredients to enable it to be cured as well as to impart certain essential properties to the product. The utmost cleanliness is maintained: all dust is kept from the churning room; the air in the dipping room is washed, filtered and dried; and special devices are provided to catch any foreign particles that may enter.

The porcelain hand-shaped forms upon which dipped gloves are made are immersed from twenty to thirty times in the viscid, maroon-colored rubber solution, and between each dipping the gloves are left for at least twenty-four hours to drip until dry, the fingers pointing up after the first dipping and down after the second, and thus alternating until with sufficient immersions the desired coating thickness is obtained. Next the coated forms are taken to the vulcanizer and cured in live steam. Especial care is taken to have the thickness gage of linemen's gloves true throughout, and the finger tips and the part between thumb and forefinger are doubly checked to insure utmost non-conductivity and durability.

Davol Surgeons' Gloves

Who Use Rubber Gloves

While battery and electrical workers and photo-engravers use practically none but dipped gloves; and coke handlers, dairymen, firebrick workers, firemen, clam diggers, foundrymen, glass workers, plasterers, policemen, potters, sandblasters, sportsmen, and tanners confine themselves to hand-made gloves; both types of hand coverings are, however, used by automobile makers and repairers, workers in chemical factories, in cloth and fur dyeing, fruit picking and packing, hospital and laboratory work, in railroad work, and by physicians and undertakers. This is not taking any note of the almost exquisite type of pure gum dipped gloves made exclusively for surgeons, which almost completely preserve the tactile sense in the hands during operations and which like many other excellent makes of dipped gloves are still cold or acid cured. Latex gloves will be described in a forthcoming issue.

Dogbane as Rival of Golden-Rod

A new candidate for the honor sought for golden-rod as a potential source of native American rubber is the long-despised dogbane, a common weed, which, according to a recent bulletin of the Missouri Botanical Garden, St. Louis, Mo., is entitled to a definite place among plants of economic value. Research, it is stated, shows the weed to have considerable rubber content, which can be largely increased with drought and soil infertility.

Dogbane (*Apocynum androsaemifolium*) is one of the Apocynaceae family, which has 130 genera and 1,100 species. It is a smooth, reddish-stemmed herb about 3 feet high, oppositely set entire leaves, clusters of bell-shaped red-striped white flowers, and a bitter, milky, viscid juice. Some Apocynums are heavy rubber bearers, notably the *Chonemorpha elastica*, a Philippine vine. It is regarded as possible that through selection and cross-breeding a dogbane plant may be developed which would supply rubber on a commercial scale.

Rubber Power Transmission Belting III[1]

Flexing Machine and Dynamometers for Testing Belting Quality — Comparison of Adhesion, Flexing, and Dynamometer Tests

W. L. Sturtevant

PLY adhesion determined by any of the friction testing methods was for years the standard laboratory criterion of belting quality, but it is gradually being replaced by the flexing test. This test yields results comparable to those obtained in service. It was developed by Sub-Committee XVI on Flexing Tests, of Committee D-11 on Rubber Products, American Society for Testing Materials. Chemists and engineers of the United States Rubber Co. General Laboratories, The Goodyear Tire & Rubber Co., The B. F. Goodrich Co., Boston Woven Hose & Rubber Co., and The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., constituted the sub-committee membership.

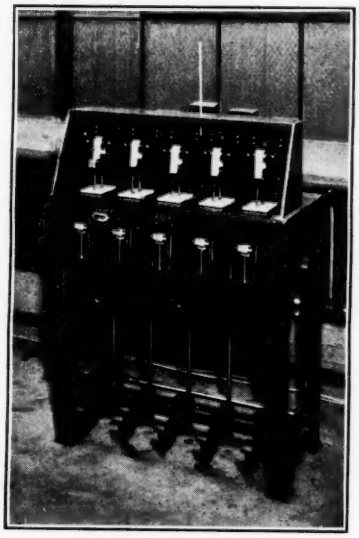


Fig. 1. Flexing Machine

This sub-committee after much experimental work decided upon the flexing machine, originated by the U. S. Rubber Co. General Laboratories.

The flexing machine pictured in Figure 1 consists of five hubs, 1¼ inches in diameter, and is capable of testing five samples of belting at one time. It is approximately 50 inches high, occupies a floor space about 38 by 26 inches, and is driven by a ¼ h.p., 1,750 r.p.m. motor. The test sample has a travel in one direction of 2⅝ inches and a full cycle travel of 5¼ inches. The speed of operation is 170 cycles per minute. The chamber in which the samples are flexed has a sliding glass front to eliminate influences of temperature and atmosphere on routine testing and to permit control of these factors in experimental work. The machine is of rugged design with large sized parts and bushed bearings, insuring long life and simple repairs. Tests are recorded in flexing cycles by a counter attached to the machine. The average life of a high grade belt on the machine is 4 hours. The test is complete when a separation of a ply occurs completely across the sample.

One-inch wide samples for test should be taken lengthwise of the belt, and their locations recorded. Care should be observed that the width dimension is accurate. This is important as the belt performance on the machine is a function of the width of the sample. The pulley side of the test sample is placed around the 1¼ inch hub; the arc of contact is about 135°. The ends of the sample are gripped by clamps, and the action is a flexing back and forth over the hub. The total load on each hub should be 100 pounds, which is equal to 12½ pounds per inch per ply. A minimum of ten samples from each belt should be tested to obtain a good average.

When a test is started, it must be continued to completion without interruption. The machine must not be stopped and allowed to remain inactive for any length of time and then be started up again. Each hub, however, may be released momentarily from its weight by means of the foot lever for the purpose of examining the sample. The end point, or failure, can only be determined by inspection. Usually fine particles of the dislodged friction may be discerned on the white plate beneath the hub when separation begins between the plies of the sample. Failure is accepted when the first clear separation occurs across the full width of the sample.

Sometimes separation begins at and travels along one edge a considerable distance before it extends across the width of the test piece. Frequent inspection of the sample undergoing test is imperative if reliable results are expected. When the first indication of ply separation appears, samples must be closely watched and the frequency of the inspection increased to assure proper determination of the end point. None but experienced operators should make this determination. The temperature and the humidity of the test chamber during the test should be recorded as well as the flexing cycles or counter readings.

Factors Influencing Tests

The effect of certain factors upon the results of tests by the flexing machine have been investigated and their influences found to be severally as recorded below.

The effect of hub diameter on flexing cycles of a 4-ply belt was determined on samples flexed over ¾-, 1-, 1¼-, and 1½-inch hubs.

The results are shown graphically in Figure 2. Each point on the curve is the average of about 50

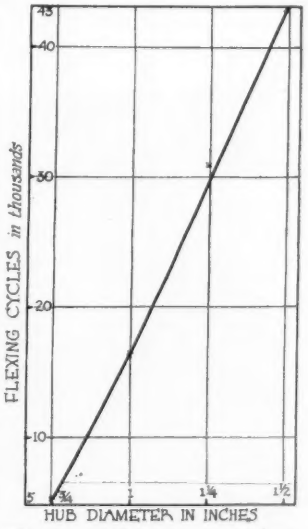


Fig. 2. Hub Diameter Effect

[1]Continued from India Rubber World, Nov. 1, 1930, pp. 63-65.

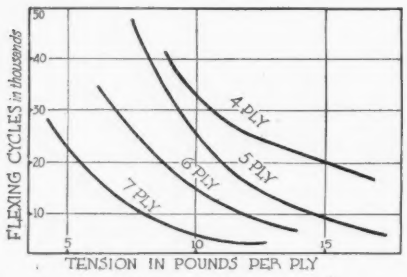


Fig. 3. Effect of Number of Plies

flexed samples. Flexings average 5,600 on the ¾ - inch hubs; 16,700 on the 1 - inch hubs; 31,000 on the 1¼-inch hubs; and 43,200 on the 1½-inch hubs. While these results may not check exactly with another set of samples from similar belts, they are accurate within the experimental error usual in this type of testing. The curve is approximately a straight line between 1- and 1½-inch hubs on a 4-ply belt, but it takes a different form when other plies are used. It is true, however, that regardless of the ply of the belt the flexings increase as the hub size increases.

The effect of tension and number of plies was determined using a series of 4, 5, 6, and 7 ply belts uniform as to fabric style, friction, and construction. All belts were tested on 1¼-inch hubs, but at varying tensions per inch per ply. The flexings are indicated graphically in Figure 3, and an example of the effect at 9 pounds' per inch per ply and at 12½ pounds' per inch per ply is given in Table I.

TABLE I

Tension per Inch Wide per Ply

Ply of Belt	Pounds	Flexing Cycles
4	9	39,000
5	9	33,500
6	9	18,500
7	9	7,000
4	12½	24,250
5	12½	14,500
6	12½	11,250
7	12½	4,500

It will be noted that flexing cycles decrease when plies are increased and the load and hub size remain constant. This effect is due to the varying thickness of belts resulting by increase or decrease in the number of plies. It is also evident that flexings decrease when tension increases. In other words ply separation is hastened by small pulleys and high tension.

The effect of temperature and humidity upon flexing quality is shown in Table II. The results indicate that the flexing index is not affected by any ordinary conditions of humidity or temperature. Such severe conditions as high and low humidity at 120° F. do not affect the quality; neither does low temperature. The only condition that affects the flexing quality is temperatures above 150° F., according to these results.

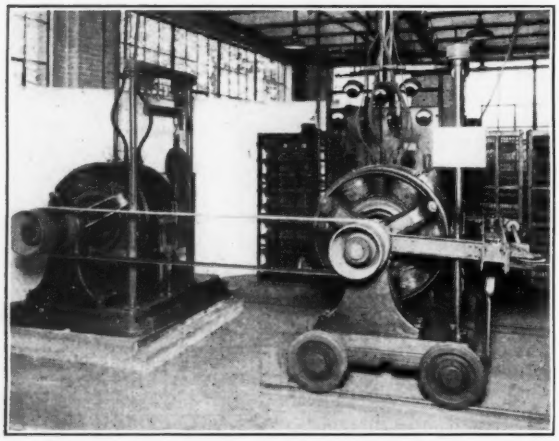


Fig. 4. Sprague Dynamometer

TABLE II

Relative Humidity	Temperature in Flexing Chamber, Degrees F.	Temperature Between Plies,* Degrees F.	Flexing Cycles
Normal humidity	90-95	140	33,000
High temperature	160	170	22,000
10 per cent	120	150	36,000
100 per cent	120	150	34,000
Low temperature; solid CO_2 on sample during test	...	50	37,000

*Thermocouple used.

In the opinion of the Flexing Test Committee of the American Society for Testing Materials the flexing machine is a valuable piece of laboratory apparatus for development and research work. When used by experienced operators, it has been largely responsible for marked improvement in the life of rubber transmission belting and tires.

Power Belting Life

The most efficient method of determining the life of rubber belting is by the dynamometer test. The apparatus used is a Sprague electric dynamometer set and consists of two ball bearing cradle type dynamometers (Figure 4), each of 100 h.p. capacity, mounted on individual bases. One machine is secured to a solid foundation and the other on a movable base, to allow for belt tension adjustment. The tension is measured by means of a Toledo scale, coupled directly to the pedestal of the movable dynamometer. The torque is measured at a point 21 inches from the shaft centers, with beam scales connected by means of knife edges to the cradle supported field frames.

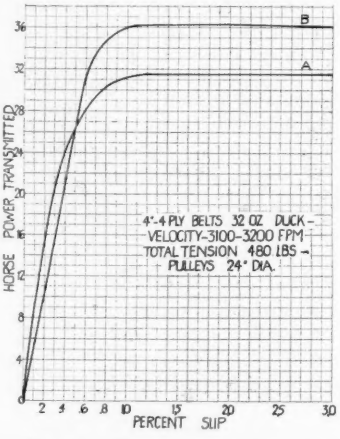


Fig. 5. Horse Power Slip of Belting

In order to obtain a wide range of speed variation both machines are driven from a constant source of direct current. One machine is operated as a motor at variable speeds, and the other, driven through the belt under test, is used as a generator to absorb the load. Speed limits are between 450 and 1,200 r.p.m.

Tests are made under the following conditions: pulleys, 4-inch; lineal speed of belts, 1,000 feet per minute; total tension, 550 pounds; slip, 1 per cent. The total tension of 550 pounds equals a slow running, no load tension of 17 pounds per inch per ply. The slips are obtained by varying the field current on the absorption machine.

The unit admits making two sorts of tests, one giving the characteristics of the belt and the other a life or service test. The first, or characteristic test, utilizes 24-inch pulleys, at a belt speed of 3,100 to 3,200 feet per minute. From this test is determined the horse power the belt will transmit, its efficiency, effective pull, tight and slack side tensions, sag of the belt, arc of contact, coefficient of friction, and per cent of slip. A horse power slip curve showing the type of results that may be obtained is seen in Figure 5.

To determine the life of a belt very small pulleys are used with rapid speeds. This type of test will determine the efficiency of the friction compounds, the ability of the belt to hold fasteners, and the stretching qualities of the belt.

Depending upon the rubber friction between the plies, some belts will last but 25 hours on the dynamometer, while others will run as long as 1,000 hours.

A Sprague dynamometer will test only a single unit of belt at one time, and often the total hours required is considerable. To facilitate and cover a greater range of work a multiple dynamometer has been designed testing nine belts at a time. (Figure 6.) The machine is so planned that one 35 h.p. motor is directly connected to the driving shaft, which is continuous and mounts six 4-inch pulleys. The opposite side of the machine is made up of six individual Prony brakes. These brakes, which are pressed steel automobile drums, slide on guides and are on the same shaft as the other 4-inch pulleys. An ingenious mechanism enables one to apply the necessary tension to the belt, and it is a part of the secondary or Prony brake unit. This machine is used exclusively for service and factory control tests. The belts tested in this machine are 4-inch 4-ply, running over 4 pulleys, traveling at 1,000 feet per minute, with slow running tension of 17 pounds per inch per ply on each side of the belt. The multiple dynamometer is used for the determination of belt life only; while the Sprague dynamometer may be used for both life and power determinations. It is recognized that the dynamometer operating under the above conditions gives an accelerated life test and is the closest approach available to actual service conditions. End point, or belt failure, is determined when the plies separate for a distance of 5 inches. The majority of failures occur between the two outside plies. Table III shows the dynamometer life of two grades of 4-inch 4-ply transmission belting, all purchased in the open market.

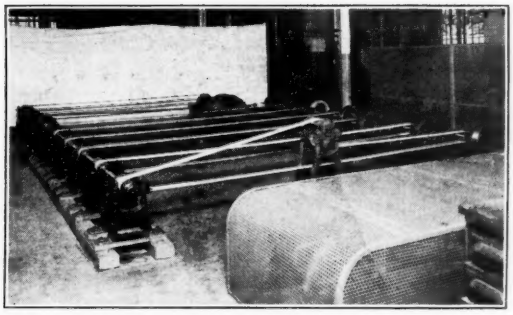


Fig. 6. Multiple Dynamometer

TABLE III

Belts	Life, Hours
A	300
B	320
C	426
D	850
E	900
F	980

Belts *A*, *B*, and *C* in Table III had a skim between the two outside plies; the remainder of the belts, representing higher qualities, were skimmed between all plies.

These tests show that the dynamometer will indicate the quality of a belt and emphasize the great value of skim coatings between the plies.

Differentiating Belting Quality

Tests made to determine if the flexing machine results indicate the quality of belting grades, show that they definitely differentiate them. These tests recorded in Table IV were made on a group of three belts. Belt *A* was of medium quality, and belts *B* and *C* were both high grade, marketed as being the same quality, although made by different manufacturers. All were purchased in the open market, and each was 4-inch 4-ply.

TABLE IV

Belt	Flexing, Average	Dynamometer, Hours	Adhesion, Pounds
A	5,950	144	17-18
B	28,900	300	23-25
C	41,500	650	24-25

Belt *A* is shown to be of medium quality, the adhesion, flexing, and dynamometer tests being in accord on this belt. Belts *B* and *C*, both supposed to be high grade, are shown to be of quite different quality. The adhesion tests show them to be of equal quality, but dynamometer and flexing tests indicate belt *C* to be superior to belt *B*. This instance shows the fallacy of judging the quality of a belt by the adhesion test. By reason of its unreliability the adhesion test is declining in favor with rubber belting manufacturers in favor of flexing and dynamometer tests as a means of indicating belting quality or life. Experience shows that flexing and dynamometer tests are equivalent in value and closely indicate belting life under service conditions.

(*To be continued*)

Industry and Trade

From Report of National Industrial Conference Board

THOUGH further curtailment in manufacturing and business activity in October resulting in the shrinkage in employment and payrolls of factory and general wage earners has combined with a relatively slight decline in costs of living further to deplete the ability of consumers to purchase goods and services, there are signs that industry has reached a point where replenishment could begin.

The month of October touched the lowest point reached by business since the beginning of the recession. Activity during the first half of November is at approximately the same level, judging from indications to date, but the current month in normal times presents between-season readjustments in production and retail sales.

Automobile production in October declined sharply under the level of September and under the average output of the previous three months. Estimated output for the United States and Canada of 156,700 cars and trucks represents a much sharper than seasonal decline. The loss for the month as compared with output of the three preceding months is 36 per cent as against a normal seasonal downturn of 6 per cent. October's production is the lowest for the month since 1921. Foreign sales accounted for 16 per cent of all sales this year. Sales abroad last year were 17.6 per cent of total sales.

Gasoline stocks amounting to 36,740,000 barrels declined 4 per cent under September's. Consumption during September, the latest known, moved upward counter to the normal seasonal movement. The decline in stocks during October was not seasonal but was due most likely to restricted production and increased consumption.

Crude rubber consumed in October increased to 27,271 long tons, an 8 per cent gain over September but a 3.7 per cent decline under the average on the three preceding months. The decline is counter to seasonal. Stocks on hand at the end of October amounting to 184,700 long tons gained by 9 per cent over the previous month and 18 per cent over the average of the three preceding months.

Tires on hand September 30 continued downward under August losing 10.6 per cent. Pneumatic casings amounted to 9,812,000. Shipments by manufacturers during September, latest known, declined 15 per cent under the preceding month, the decline being greater than in preceding months.

Moisture Regain Tests

Tire and Fabric Manufacturers' Specifications

THE Standardization Committee of Tire and Fabric Manufacturers at a meeting in Boston, Mass., October 15, 1930, definitely and unanimously disposed of one of the most difficult and perplexing problems confronting the tire fabric industry for many years: the matter of moisture regain in tire fabrics, both woven and on cones.

The committee has covered the whole subject very thoroughly, establishing a maximum standard of 6½ per cent for allowable moisture regain covering deliveries over a period of a year, together with a tolerance up to 7 per cent for individual shipments. Procedure covering method of figuring rebate for excess moisture, etc., is covered, also a standard method for taking samples for moisture regain test and for determining moisture regain present. A standard method of calibrating a cord testing machine was also adopted by the committee. These two additions just adopted by the standardization committee are as follows:

Moisture Regain

Tolerances

Moisture Regain Yearly Average. The average moisture regain determined by test shall not exceed 6½ per cent when based on results covering a 12-month period, said 6½ per cent constituting a yearly average maximum standard. Should the moisture regain over this period average in excess of 6½ per cent, adjustment for the entire deliveries at the end of this period shall be made back to the 6½ per cent standard basis.

Moisture Regain Individual Shipments. The average moisture regain of an individual shipment shall not exceed 7 per cent. Any individual shipment containing more than 7 per cent moisture regain shall immediately be adjusted back to the 6½ per cent standard basis.

Reporting Tests. Provision shall be made between consumer and producer for reporting test results at the end of each month for material tested during that month, in order that each party may make whatever corrections are necessary and to simplify records in anticipation of any adjustment made at the end of the 12-month period.

Monthly records shall be based on amounts of material invoiced during that month, rather than on amounts received.

Tests Corrected to Invoice Weight. All moisture regain tests shall be corrected to the invoiced weight of the roll or cones from which the tests are made, and these corrected moisture regain figures shall be the results reported and shall constitute basis on which adjustment may be made.

Adjustments. Adjustment shall take into consideration the amount of material invoiced during the month with the corrected moisture regain for that month by dividing the invoice weight by 100, plus the corrected moisture regain, and multiplying the result by 1.065. The difference between this figure and the invoice weight shall represent the amount of overweight or underweight as the case may be. If the total for the 12 months shows a weight in excess of the total invoice weight for this period, this amount shall represent the claim to be adjusted as excess moisture for this period.

Methods of Testing

Number of Tests. On woven fabrics or on cones, not less than one moisture regain test shall be made for each 6,000 pounds of material per style.

How Taken. On woven fabric a small sample weighing approximately 20 grams shall be cut from the outside of the roll at least 12 inches in from the selvage on the same day the fabric is received or within 24 hours and placed immediately in an airtight container, which has been kept in a desiccator. After the roll has been run through, a similar sample shall be cut from the inside end. In the case of cord on cones, a small skein weighing approximately 20 grams shall be reeled from the outside of the cone on the same day the cord is received or within 24 hours and placed immediately in an airtight container, kept in a desiccator.

Test Procedure. Preferred Method. The sample of material cut as described in the second paragraph of Methods of Testing shall be weighed immediately on a scale or balance sensitive to 0.1 per cent of the total weight. After weighing, the sample shall be removed from the container, which is returned to the desiccator and placed in a ventilated drying oven maintained at a temperature of from 100 to 110° C. (212 to 230° F.) and dried to constant weight as determined by two consecutive weighings without removal from the oven, to be taken not less than 10 minutes apart, and showing a further loss of not more than 0.1 per cent from the previous weighing. The bone dry sample shall then be placed again in the container and allowed to cool for a half hour in the desiccator before being weighed. The difference between the normal net weight of the sample and the dry weight, expressed as a percentage of the dry weight, shall be the moisture regain of the material. Such is the preferred method to be used in case of dispute, but any other method satisfactory to both parties giving results comparable to this preferred method may be used for routine work.

Moisture Regain Corrected to Invoice Weight. On woven fabrics the average of the tests made from the outside and inside ends of the roll, shall be the average moisture regain of the roll. In the case of cord on cones the test made from the outside shall represent the average moisture regain of the cone. These average moisture regain tests shall be corrected to invoice weight of the material as follows:

$$\frac{\text{Receiving Weight of Roll}}{\text{100 plus Moisture Regain}} = \text{Theoretical Dry Weight of Roll.}$$

$$\frac{\text{Invoice Wt. of Roll}}{\text{Dry Wt. of Roll}} \text{ minus 100} = \text{Per cent Moisture Regain Corrected to Invoice Weight.}$$

Example: Invoice weight, 552 lbs.; receiving weight, 550 lbs.; regain on test, 6.40 per cent.

$$\frac{550}{1.064} = 516.9 \text{ theoretical dry weight.}$$

$$\frac{552}{516.9} = 1.0679$$

$$1.0679 - 1.00 = .0679 = 6.79\% \text{ regain corrected to invoice weight.}$$

Standard Method of Calibrating Cord Testing Machines

Zero Position. First remove the upper jaw, upper jaw chains, cord and counter weight, and the chain which operates recording mechanism. Then lift pawls, but do not put on brake, and allow head to come to rest. Set pointer at zero and screw tightly into place and replace upper jaw, upper jaw chain, cord and counter weight, and the chain which operates recording mechanism.

Again lift pawls, but do not put on brake, and allow head to come to rest. Attach sufficient weight to recording mechanism to overcome all frictional resistance with pen riding on chart. Then attach sufficiently heavy counter weight to upper jaw to bring machine at rest with pointer at zero. The machine is now properly set at the zero position, and

none of the aforementioned adjustments are to be changed.

Calibration. A specially designed calibration apparatus which may be obtained from the machine manufacturer shall be used for this purpose. The lower jaw of the testing machine is first removed and in its place is screwed a small plate or supporting stud. The lower jaw is then screwed into place in the initial calibration weight of the apparatus which weighs exactly 6 pounds including the jaws. The machine is then thrown into gear in order that it may support this initial weight, which is placed on the supporting stud. The distance between jaws shall then be set at 10 inches between nips, and a cord similar to the material about to be tested shall be inserted in the jaws in the usual manner. When the supporting stud drops far enough, the calibration weight will be suspended on the upper jaw; and the pointer should show 6 pounds, and the pen indicate 6 pounds on the chart.

Repeat this performance at different loads by adding additional calibration weights to the initial piece, using a new strand of cord with each calibration. Calibration weights of 2 pounds each should be provided up to a total capacity of at least 20 pounds, together with a single one pound weight for odd number calibrations.

Any error shown by this check should be a progressively increasing one at from 6 to 20 pounds and should be corrected by turning the adjusting screws on the pendulum either in or out until readings at all points are correct. Any error that does not progressively increase indicates an incorrect balance between counter weights when checking at zero.

The above new procedures represent additions to the standard methods of test for tire cord originally adopted by the committee June 7, 1929. Since that date, the methods have been enlarged considerably by the committee and have been adopted in their entirety by the American Society for Testing Materials through its Committee D-13. Copies of the complete specifications may be had by addressing A. S. T. M., 1315 Spruce St., Philadelphia, Pa.

French Floor Coverings

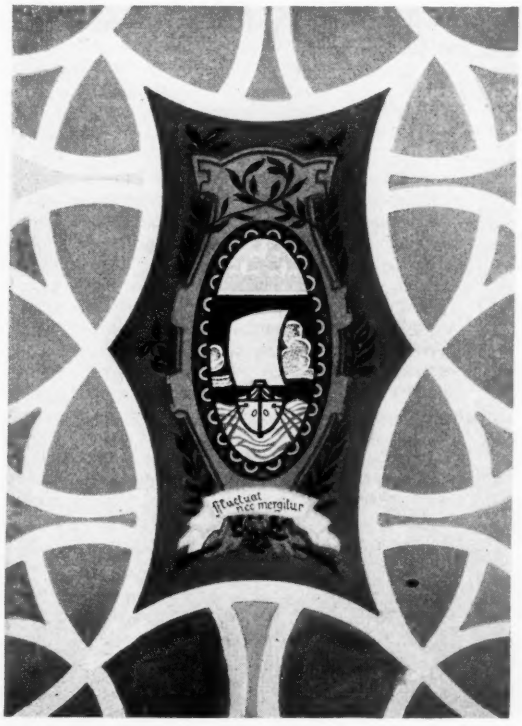
Designs and Colors Ranging from Plain Monotones to Elaborate Landscapes

THE variety of designs and color combinations in which it is now possible to produce rubber floor coverings is truly astonishing. It is small wonder that rubber, offering as it now does to the interior decorator or the architect an opportunity of giving adequate expression to his most original conceptions, in a medium that answers all demands of durability, comfort, and cleanliness, is rapidly gaining favor with the discriminating. With their well-known feeling for beauty, the French would be expected to make a fine showing in this field, and as a matter of fact carpets of great beauty and distinction are being produced by French manufacturers.

One important French concern, the Société Industrielle des Téléphones, has supplied carpeting for important shipping companies, banks, hotels, and department stores, in a range of designs and colors running the whole gamut from the plainest monotone or mottled effects, occasionally relieved only by contrasting bands or borders, to the most elaborate landscapes carried out in bold poster style; from simple black and white tilings to modernistic geometrical patterns in various ombre tintings; from the classic and traditional to the most sophisticated and up-to-date.

Some of the finest samples of mosaic and tiling produced by this company are to be found in the lobbies, corridors, and on the stair-cases of several of the boats of the French line.

There is for example, the flooring in the main lounge hall of the *S.S. Paris* which is shown in the accompanying illustration. It is a very pleasing design of intersecting circles in pale gray-blue, cream, and delicate buff, marked off into large rectangles by matching borders, and having in the center on a background of darker gray-blue a shield of buff faintly outlined in red and wreathed about with dull-green leaves and red berries. The device on the shield is a vessel in full sail, done in white outlined in dark maroon, sailing on a heaving sea of white and blue, and posed against a red sky with white clouds, which a narrow white band separates from a field of light gray-blue bearing three white *fleurs-de-lis,* the whole being enclosed in an oval border of dull maroon and white. At the bottom of the shield, on a white scroll outlined in pale gray-blue, is inscribed the motto *"Fluctuat nec mergitur."*



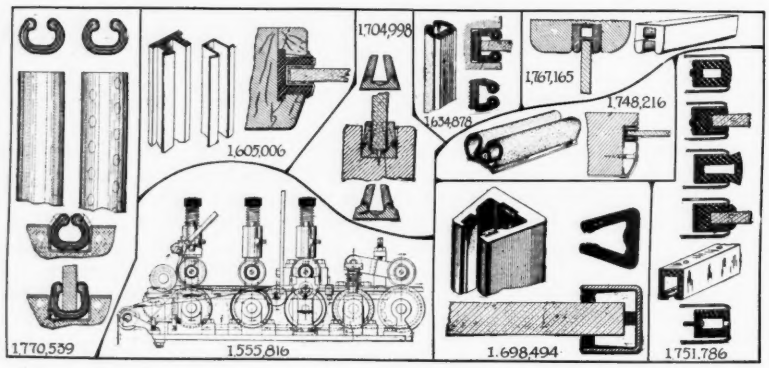
Design of Rubber Carpet in the Main Lounge Hall of the *S. S. Paris*

Of an entirely different character is the flooring laid in the barber shop of "Au Bon Marché." Here a plain brown taupe surface was boldly broken at intervals by huge triangles built up of smaller triangles in ombre tints of brown and slate-blue, the latter capped in pale yellow; while the entire design was bordered by a band of brown somewhat darker than the background.

For the stairs of a hotel a covering in mottled green with border of narrow bands in brown and two shades of tan, was supplied. This carpeting joined a large rug of plain tan decorated with big spots of dark brown and huge motifs in mottled green bordered with dark brown; the colors, green, brown, and tan were repeated in the bands that formed the border of the carpet.

In conclusion it may be observed that carpets can be obtained from this company in almost any shape, round, oval, etc., as required, while coverings are supplied in continuous lengths up to approximately 49 feet by 14 feet 8 inches wide.

Rubber Window Channels



THE following abstracts of United States patents relating to the manufacture of rubber channels are continued from INDIA RUBBER WORLD, November 1, 1930.

1. Liness, 75,556. Mar. 17, 1868. The rabbets of a window frame are provided with rubber linings to prevent breakage of the glass pane.

2. Carpenter, 131,662. Sept. 24, 1872. A strip of rubber bent into channel shape is placed in the grooves of a window sash.

3. Keene, 163,016. May 11, 1875. A rubber strip has a projecting tongue in one face to fit a corresponding groove in a window sash to retain it in place. The other face has a fine groove for receiving the glass.

4. Roebuck, 221,614. Nov. 11, 1879. A weather strip is made from a strip of rubber coated with varnish and flock.

5. Tanner, 252,707. Jan. 24, 1882. Fastener for window glass consists of a rubber strip triangular in cross-section provided with the groove narrower at the top than the bottom to hold the edge of the glass.

6. Tanner, 269,740. Dec. 26, 1882. A rubber strip is provided with the longitudinal slot increasing in width toward its interior.

7. Mulford, 271,900. Feb. 6, 1883. This consists in a cushion composed of a central core of leather and a flexible rubber tube, having opposite sides flattened and secured by stitching against the core, and pockets formed between it and the core.

8. Auth, 377,474. Feb. 7, 1888. A window channel is made from rubber tubing slit longitudinally.

9. Tinker, 516,245. Mar. 13, 1894. The rubber channel is covered with tinfoil or paper to prevent the glass from sticking.

10. Phinny, 936,158. Oct. 5, 1909. A window channel is formed from two separate rubber strips having mating grooves for receiving the glass.

11. Friedel, 970,438. Sept. 13, 1910. Semi-cylindrical rubber tubing is used as a window channel.

12. Matthews, 977,415. Nov. 29, 1910. A U-shaped rubber channel is covered with canvas.

13. Lee, 1,370,894. Mar. 8, 1921. This channel has grooved rubber guide ways; the opposite sides of the grooves are formed to extend convergently and are inwardly curved and adapted to yield, to correspond to the thickness of the glass, and to engage the surface of the glass at their edges only.

14. Gammeter, 1,459,095. June 19, 1923. A window-pane retaining strip composed of hard rubber has a dense external surface, a cellular internal structure, and a textile covering.

15. Simpson, 1,463,444. July 31, 1923. The window guide is made up of a rubber channel covered with velveteen, plush, satin, or similar material. The opposite side of the channel is provided with a longitudinally running anchoring rib which is adapted to lie in a rabbeted portion of the window molding.

16. Gammeter, 1,489,433. Apr. 8, 1924. Flexible window-guide channels are made by folding a rubber strip upon itself to form the legs and base of the channel, enclosing a fabric reenforcing strip in the base between the plies of the rubber strip, and vulcanizing.

17. Davidson, 1,489,484. Apr. 8, 1924. Flexible, cloth-surfaced window-guide channels are made by calendering a wide sheet of cloth with a coating of rubber on one side, cutting it into channel-forming strips folding the strips into channel form with the cloth face outside, and vulcanizing.

18. Thomas, 1,490,240. Apr. 15, 1924. The rubber channel is provided with a projecting curved longitudinal extension in order to retain it in place.

19. Ambler and Rohrbacher, 1,555,816. Oct. 6, 1925. The method of adhesively applying a covering strip to a channel strip comprises feeding the two strips longitudinally into contact with each other so that the middle of the covering strip and the floor of the channel are the first parts of the strips to contact each other, and progressively wrapping and pressing the covering strip in successive steps laterally about the channel strip in opposite directions from the floor of the channel. (See group illustration.)

20. Fischer, 1,577,214. Mar. 16, 1926. The U-shaped rubber channel has a convex shaped bottom which contacts with the glass.

21. Fischer, 1,577,215. Mar. 16, 1926. This patent shows a fabric covered channel, the legs of which incline toward each other.

22. Mularcik, 1,580,754. Apr. 13, 1926. A U-shaped rubber channel is provided upon the inner faces with depressions forming vacuum cups that cooperate with the adjacent edges of the pane for holding it against movement.

23. Beynon, 1,581,777. Apr. 20, 1926. A method of making rubber window glass channel is by compressing together and partially vulcanizing a sheet of fabric between two molds, one having ridges that subdivide the sheet into strips and the other having ridges that produce lines of fold in such strips, then cutting the sheet along the lines of subdivision, and finally bending the strip along such lines of fold into channel form, and completing the vulcanization.

24. Simpson, 1,605,006. Nov. 2, 1926. This channel is provided with a flange at the end of one of the legs in order to form a good weather seal when in use. (See group illustration.)

25. Weymann, 1,619,047. Mar. 1, 1927. A rubber tube is slit longitudinally and encased in a felt or cloth lining.

26. Ambler, 1,632,816. June 21, 1927. The method of adhesively applying a covering strip to a length of rubber strip material formed with a channel of progressively varying depth, comprises spreading open the channel of the strip at the end where its depth is least, attaching an end of the covering strip to the inner channel surface of the opened part, and longitudinally feeding the channeled strip to draw the cover thereupon while tensioning the covering strip by continuous engagement with a given part of its trailing end portion.

27. McKinney, 1,634,878. July 5, 1927. A rubber runway for windows has a base provided with a series of serrations upon its under surface and also projecting sidewalls adapted to contact with opposite surfaces of a slidable window pane. (See group illustration.)

28. Hartung, 1,661,169. Feb. 28, 1928. The method of making channel rubber strips comprises simultaneously, extruding a plurality of strips so that they adhere lightly to each other, conveying the strips, and further manipulating them as a unit in factory procedure while they remain in such association, and subsequently separating the strips.

29. Tannewitz, 1,670,321. May 22, 1928. A rubber strip U-shaped in cross-section,

two flexible tubes outside of the strip and parallel to the edges thereof and a sheet of fabric surrounding the tubes and extending into the groove of the U-shaped strip.

30. Freyer, 1,698,494. Jan. 8, 1929. Each of the inner faces of a rubber channel is provided with narrow felt or fabric inserts. (See group illustration.)

31. McManus, 1,699,490. Jan. 15, 1929. A channel for automobile windows has a troughed metal portion and a lining composed of a strip having a textile core, a surface stratum of cork granules bonded together and to one side thereof, and a surface stratum of soft rubber bonded to the other side.

32. Matthias, 1,702,123. Feb. 12, 1929. The method of producing channel rubber comprises forming two channeled rubber strips, associating them with each other with a leg of each strip extending into the channel of the other, and vulcanizing the strips while they remain so associated.

33. Atzenhoffer, 1,704,997. Mar. 12, 1929. A channel comprises a resilient soft rubber base and a hard rubber frictionless lip vulcanized to the base, the lip being movable.

34. Atzenhoffer, 1,704,998. Mar. 12, 1929. This channel has a soft rubber base, hard rubber sidewalls secured to the base, and a hard rubber connecting portion between the sidewalls. (See group illustration.)

35. Griffiths, 1,708,059. Apr. 9, 1929. The method of making channel window guides consists in superimposing a strip of rubber on a strip of fabric, folding the fabric to cover all sides of the strip, severing the strip into lengths, and subjecting such lengths to a single forming and vulcanizing operation.

36. Fauver, 1,716,219. June 4, 1929. A rubber channel has a stiff self-supporting base of open mesh fabric permanently secured beneath the under surface of the channel.

37. Greene, 1,748,216. Feb. 25, 1930. A glass runway has a laminated strip of rubber and felt, shaped to form the base and sides of a channel, the edges of the strip being return-bent to lie in spaced relation to the sides and terminating adjacent the base. (See group illustration.)

38. Griffiths, 1,751,733. Mar. 25, 1930. A window channel strip comprises intermediate flat strip of rubber, a flat strip of rubber on each side thereof in the plane of the intermediate strip, a fabric covering completely enveloping and united to the strips of rubber, the upper and lower layers of the fabric covering meeting between the strips to form extremely flexible fabric hinges.

39. Best, 1,751,786. Mar. 25, 1930. A sponge rubber strip is fastened in the window channel to form a square tube. The glass edge is pressed against the outer wall of this tube, which yields sufficiently to form a channel. (See group illustration.)

40. Van Hove, 1,753,038. Apr. 1, 1930. A felt channel is provided at the edge of one leg with a rubber tube.

41. Hood, 1,763,522. Jan. 10, 1930. A molded sponge rubber channel has a rounded inner face.

42. Bickett, 1,767,165. June 24, 1930. A weather strip is molded in a single piece having a U-shaped body provided with a flexible intermediate unbroken transverse wall between and integral with the sidewalls at the longitudinal center of the body. (See group illustration.)

43. Lockman, 1,770,539. July 15, 1930. A C-shaped rubber channel is reenforced internally with thin sheet steel. (See group illustration.)

44. Matthias, 1,771,502. July 29, 1930. A channel strip has a stiff base of rubber impregnated fiber legs comprising sponge-rubber extending from said base, and fibrous cover material on the legs.

Para Rubber Seed Oil

A By-Product of Increasing Importance

THE Para rubber seed, the product of *Hevea brasiliensis*, is a by-product of great potential value, and many investigations have been reported from time to time. The kernel is about 50 per cent by weight of the seed and, when air-dried in good condition, contains about 45 per cent of oil.

Freshly prepared, the oil is yellowish in color and free from deposits of solid acids; analysis[1] shows it to consist of a mixture of solid saturated, and liquid unsaturated acids, the mixed fatty acids obtained being: saturated acids 14 per cent, largely stearic acid; unsaturated acids 86 per cent, oleic 32.6 per cent, linoleic 50.9 per cent, and linolenic 2.5 per cent.

The unsaturated acids are lower in percentage than is the case in linseed oil, which has an effect upon the drying properties. The following comparative figures[2] are of interest:

	Para Rubber Seed Oil	Linseed Oil
Specific gravity 15° C...	0.924-0.932	0.931-0.937
Acid value.....	10.7-56.4	0.8-8.4
Saponification value	185-193	189-195
Iodine value	121-143	175-200

There seems to be no doubt that the high acid values often obtained with the Para rubber seed oil are due to deterioration of the kernels before extraction, caused by a fat-splitting enzyme, for Dunstan[3] has isolated a mixture of hydrolyzing enzymes from the seed. According to his statement, the enzymes include a lipase like enzyme, and also one capable of decomposing the cyanogenetic glucoside present, since prussic acid is evolved when the kernels are in contact with water.

Owing to the lower iodine value the oil could not command so high a price in the paint trade as linseed oil, and the acid value would require to be kept at a minimum. Gardner[4] reports a sample with an acid value of 57, mixed with sufficient quantity of cobalt drier to give a dry film with linseed oil as being still sticky after several days. He found that heating with glycerine and calcium resinate to 260° C. improved the drying, the acid value being reduced by this method to 5.1. The drying properties were still inferior to those of linseed oil but practically the same as for soya bean oil.

The Para rubber seed oil has been found to yield a good quality soft soap, comparable with that obtained from linseed or cottonseed oils; but it is not of value for linoleum manufacture, and is of doubtful value for the preparation of rubber substitutes.

Various investigators have observed its value in cattle cake, and it has been found[5] that the decorticated Para seed cake is one of the most digestible concentrated foods available. The amount of fiber in the whole seeds, however, renders the cake from this source of much lower value. The manurial value of the cake is equal to that of linseed cake. No danger exists from the small amounts of prussic acid which may be evolved from the cyanogenetic glucoside in the cake. This characteristic in fact is similar to that of linseed cake.

Recently an American corporation developed the manufacture of rubber seed oil. The seed is decorticated in Sumatra, and then exported, the quality being guaranteed by certificates. During 1928, 7,905 tons of seeds were exported in connection with this venture alone, practically the whole being intended for oil production. The costs of production allow a fair margin for profit after all freightage charges had been met. Unfortunately, the reports on the export of rubber seeds from British Malaya for this year are not so favorable, the exports having become negligible.

Difficulty has arisen in connection with the introduction of the seed into Sumatra, due to fear on the part of the Dutch authorities of spreading disease. In addition, the quarantine laws of the United States call for a certificate from the Malayan agricultural authorities, showing that the seeds were properly fumigated and free from disease before shipping. These difficulties largely determined the stoppage of export of rubber seeds from Malaya by the end of 1929. There seems no prospect, according to the Malayan Department of Agriculture, of rubber seed crushing mills being established in Malaya, partly because of the extremely limited season and partly because of the uncertainty of any crop at all if the season is not favorable. It is unfortunate that the machinery required for pressing is not suitable for use with other oils, without very considerable expensive alterations.

[1] S. S. Pickles and W. P. Hayworth, *Analyst*, 1911, 36, 491.
[2] *Bull. Imp. Inst.*, 1919, 17. 543.
[3] *Proc. Chem. Soc.*, 1907, 23, 168.
[4] Gardner, S. C. I., 1921. 40.226.A.
[5] Auld. I.G. *Agric. Sci.*, 1912-13, 4, 429. INDIA RUBBER WORLD, 1930, 83, 62.

EDITORIALS

Must Rubber Go Lower?

RAW rubber recently reached the lowest point in market history. Before history started it had even dropped into the German lignite beds, where miners find caoutchouc fossilized in the "braunkohl." In the far-off Mesozoic era, geologists say, a vast expanse of latex-bearing trees, probably *Ficus elastica,* sank as though the earth had opened and swallowed it. Many disheartened Restrictionists doubtless wish quixotically that history would thus repeat itself, and they could list numerous rubber areas that they are sure would never be missed were they thus to go down that rubber might come up.

Silk and sugar, wool and wheat, coffee, copper, and cotton have all sunk to rock-bottom prices; and if rubber be low, it is but sharing the common fate of all or most basic commodities. For their plight rubber growers must blame themselves to some extent. So confident were they that the feverish industrial activity which reached high tide in the middle of last year could not soon recede that they produced far beyond normal requirements, the 32 per cent rubber increase in 1928-1929 overtopping that of practically all other raw materials.

Schemes proposed for securing profits and adjusting supply and demand urge nearly everything but the reenactment of the Stevenson Act. One would have a single dictatorship, or a sort of triumvirate of British and Dutch growers and a manufacturers' representative, to peg the price at 15 cents a pound; another would have the governments refuse to lease lands for new plantings for four or five years; Dutch producers are said to favor a wholesale reorganization of the industry to set a low, stabilized price; a "control bank" is urged in which all (even native) planting interests might have shares and which would hold in check at least 100,000 tons to insure a 12-cent minimum; one scheme would provide a bonus from an export duty fund for all restricting exports to 70 per cent of 1929's output; and under the British-Dutch Liaison Committee legislative plan stocks would be released only when an 18-cent price is obtainable and exports contracted, should the price fall below 18. To make such price-pivoting more elastic, some would base it on world stocks, assuring ample supplies for even six months. Now comes the "Stop tapping entirely" plea of the London Rubber Growers' Association.

Some—maybe all—of the foregoing plans are bound to come to naught. One of the greatest lessons commercial experience teaches is the futility of any industry trying to nullify for long the universal law of supply and demand. If stocks and output keep up, prices will likely keep down; and while rubber may not sell at 6 cents before it touches 9, as one Singapore authority believes, the chances are that its return to normalcy will be gradual.

Trade's Lever Is Advertising

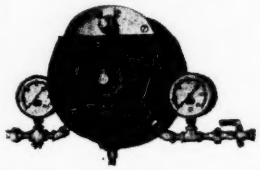
COMING events, we are told, cast their shadows before. If commerce has slowed down, inventories, too, have been reduced, production curtailed, overextended credits pared close to hardpan, and drastic economies effected in countless lines, thus providing an ideal basis for the resumption of better times. Because of these and other salutary developments, the *American Bankers Association Journal* feels justified in declaring that business has finally ceased its downward course, leaving the trend now horizontal. In short the stage is being set automatically for an upturn. Former Secretary of Commerce William C. Redfield says, as a banker, that there is no economic reason for a continuation of the depression and that business will be back to normal before we realize it. Thomas F. Lamont, of the House of Morgan, says we are working our way out; Edward W. Fi'ene sees 1931 as a very good year for the prepared.

But what of means by which the return of prosperity may be hastened? Archimedes said that had he a suitable lever, he could lift the world. Is there no comparable device with which to lift the floundering world of trade from its quagmire? Eminent economic diagnosticians believe there is, and, unlike other doctors, they agree on the remedy—advertising. Roger W. Babson, holding that the root of our evils lies in failure to develop mass consumption to keep pace with mass production, points out that though the country has more money than ever, its circulation has become so sluggish that business has lost its old snap and tone.

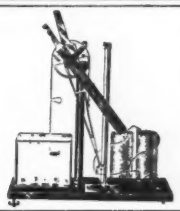
As an accelerator of the movement of money, as the surest and most available tonic for commerce, nothing, he says, can possibly rival advertising.

President Hoover in a recent address referred to advertising as "a most vital factor in our entire economic and social system, part of the dynamic force which creates higher standards of living, and which has become a powerful aid to mass distribution." Dr. Julius Klein, assistant secretary of the United States Department of Commerce, says that our most urgent need is quickening the circulation of money and stimulating normal buying. No policy, he says, could be more short-sighted at this time than quitting or materially reducing advertising. Nothing so effectively dispels doubt and timidity than the confidence expressed in advertising.

TIRES MANUFACTURED ON THE PACIFIC COAST ARE DELIVERED via the Panama Canal to the Atlantic seaboard as cheaply as tires shipped by rail from Akron. West coast producers' quotations are no higher east than west of the Rockies.



What the Rubber Chemists Are Doing



Rubber "Resins" in Zinc Oxide - Accelerator Mixings[1]

W. S. Davey

THE results of this investigation are of great interest and practical value for the rubber chemist and compounder. The principal features and results of this study are given in the following extracts.

No doubt exists that the natural fatty acids in rubber have important effects on the vulcanization of many mixings containing an organic accelerator and zinc oxide. The majority of workers who have investigated these effects have confined their attention to, and drawn their conclusions from, experiments with mixings containing about 5 parts of zinc oxide per 100 parts of rubber. Martin and Davey have shown, however, that a number of accelerators which require the help of fatty acids in the presence of 5 parts of zinc oxide are very effective without fatty acids when much larger quantities of zinc oxide are present. They have suggested that the function of the fatty acids is to prevent the flocculation of the zinc oxide and so increase the surface available for reaction with the accelerator. This is important in mixings containing low proportions of zinc oxide, but not in the case of mixings containing high proportions where there is much more than sufficient zinc oxide to satisfy the requirements of the accelerator.

Whitby and Evans, however, favor the view that fatty acids are generally essential to vulcanization in the presence of large quantities of zinc oxide, and that the function of the fatty acids is to form a zinc compound soluble in rubber, which is then capable of reacting with the accelerator. It is suggested that there is no reaction between insoluble zinc oxide and most accelerators.

The conclusions of Martin and Davey were drawn from experiments carried out with thiocarbanilide, suparac, diphenylguanidine, *p*-nitrosodimethylaniline, aldehyde-ammonia, and hexamethylenetetramine. Since then the range of accelerators in use has been considerably increased, and it was considered that the investigation should be extended to cover a range of these more recent accelerators. These were selected from the constituent groups of a classification of accelerators proposed by Dinsmore and Vogt, and comprised:

Accelerator Group	Accelerator Used
Dithiocarbamate.	Suparac.
Xanthate.	Zinc ethylxanthate.
Thiuram.	Tetraethylthiuram disulphide.
Mercaptobenzthiazole.	(a) Captax. (b) Z. 88 (ammonium salt of mercaptobenzthiazole + softener).
"Faster aldehydeamine" derivative.	A. 16.
Ethylideneaniline.	A. 7.
Guanidine.	Di-*o*-tolylguanidine.
Thiourea.	Di-*o*-tolylthiourea.
Miscellaneous.	*p*-Nitrosodimethylaniline.

The rubber used consisted of a large sample of first latex crepe. The extracted rubber consisted of portions of the same crepe which had been submitted to a period of extraction with hot acetone for at least 18 hours, and was used as soon as possible after extraction. The acid number of the extracted rubber ranged from 16 to 18. The basic rubber-sulphur mixings containing an appropriate amount of the accelerator were vulcanized (a) without any addition of zinc oxide, (b) with the addition of amounts of zinc oxide ranging from 1 to 100 parts per 100 parts of rubber at a temperature and for a range of periods depending on the activity of the accelerator.

The results generally confirm those previously obtained by Martin and Davey. Accelerators of which the activity is increased by the presence of zinc oxide produce their maximum effect only when sufficient zinc oxide is available. One part of zinc oxide per 100 of rubber is generally insufficient to produce this effect even in the presence of fatty acids. When 5 parts of zinc oxide are present, its distribution is of importance because when it is well dispersed and free from flocculates, the space between the particles is sufficiently small for complete reaction with the accelerator; but when it is badly dispersed larger quantities of zinc oxide are required for full activation of the accelerator. Fatty acids insure even distribution and therefore have a marked effect on the activation of accelerators in the presence of 5 parts of zinc oxide, but the effect is not so marked in the presence of 1 part or 20 or more parts of zinc oxide.

Of the accelerators discussed in this paper mercaptobenzthiazole and zinc ethylxanthate showed the smallest evidence of solubility in rubber, but unlike mercaptobenzthiazole, zinc ethylxanthate was easily dispersed. It is suggested that the behavior of mercaptobenzthiazole in the presence of large quantities of zinc oxide is due to its relatively slow solubility and tendency to form flocculates, which limits its sphere of action and consequently its interaction with insoluble zinc oxide.

The amount of fatty acid naturally occurring in rubber is of most importance in mixings containing about 5 parts of zinc oxide. Over one hundred samples of first-grade rubber from different estates in Ceylon were, therefore, examined in a diphenylguanidine mixing containing 5 parts of zinc oxide, but in every case satisfactory vulcanizates were obtained. It does not seem likely, therefore, that first-grade plantation rubber will cause serious variation due to the amount of acid in the rubber. Second-grade material is likely to be more variable, but no experiments have been made to confirm this.

[1] *J. Soc. Chem. Ind.*, Aug. 8, 1930, p. 338T, and Aug. 15, 1930, p. 344T.

Summary of Results

Accelerator	Parts of Zinc Oxide Necessary for the Full Activation of the Accelerator in the Absence of Fatty Acids	Reactivity of Accelerator to Zinc Oxide
Suparac	10 to 20 parts of zinc oxide.	No cure without zinc oxide. Poor cures in extracted rubber containing up to 10 parts of zinc oxide.
Zinc ethylxanthate	10 to 20 parts of zinc oxide.	No cure without zinc oxide. Good cures with 1 per cent of zinc oxide and upwards in both extracted and unextracted rubber.
Tetraethylthiuram disulphide.	30 parts of zinc oxide	No cure without zinc oxide. Good cures in presence of small amounts of zinc oxide in both extracted and unextracted rubber.
Mercaptobenzthiazole	Acids are effective with all proportions of zinc oxide.	Requires zinc oxide for activation.
Z. 88 (mercaptobenzthiazole derivative).	20 parts of zinc oxide	No cure without zinc oxide. Good cures in presence of small amounts of zinc oxide in both extracted and unextracted rubber.
"Faster aldehydeamine" derivative.	For short cures: 50 parts of zinc oxide. For long cures: 30 parts of zinc oxide.	Good cures in the absence of zinc oxide.
Ethylideneaniline	Longer period of vulcanization required in the absence of fatty acids.	Good cures in the absence of zinc oxide.
Guanidine (di-*o*-tolylguanidine).	10 to 20 parts of zinc oxide.	Good cures in the absence of zinc oxide. Acids retard the cure with large amounts of zinc oxide.
Di-*o*-tolylthiourea	100 parts of zinc oxide	Needs large quantities of zinc oxide. No cure without or with small quantities of zinc oxide.
p-Nitrosodimethylaniline.	50 parts of zinc oxide	Good cures with small amounts of zinc oxide in unextracted rubber. Needs large quantities of zinc oxide with extracted rubber.

Solubility of Oxygen in Rubber and Its Effects on Rate of Oxidation[1]

Ira Williams and Arthur M. Neal[2]

THESE investigators studied the effect of the concentration of oxygen in rubber upon its aging properties, studying such factors as temperature and pressure on the solubility of oxygen in rubber. They summarize their results as follows:

It is apparent that an artificial aging test must consider the concentration of oxygen existing in the rubber. The concentration of oxygen in rubber suspended in air at 70° C. will be less than that required for normal oxidation at the maximum rate. This should limit the use of an air atmosphere to the highest quality of rubber in which the rate of oxidation is extremely small in comparison with the rate of diffusion of oxygen, and in this case tests should be confined to thin slabs.

The solubility of oxygen in rubber suspended in oxygen at 70° C. and atmospheric pressure appears to be slightly greater than that required for uniform oxidation. Under these conditions thin slabs of good or medium-quality rubber should oxidize in a satisfactory manner. The fact that strips 4 mm. square of a rubber extremely sensitive to oxidation, when tested in an oxygen atmosphere at 26° C., produce deviation from a straight line, would make doubtful the accuracy of tests conducted on easily oxidized rubber under these conditions. This type of rubber would require 2 or 3 atmospheres' pressure in order to maintain the required oxygen concentration. The type of deterioration appearing at higher temperatures should have little influence unless high oxygen pressure is used. The use of both high temperature and high pressure may emphasize types of oxidation which are suppressed at ordinary temperature. Since little is known about this type of oxidation, it is believed that the simultaneous use of high temperature and high pressure should be avoided.

[1]Presented before the Division of Rubber Chemistry at the 79th meeting of the American Chemical Society, Atlanta, Ga., Apr. 7 to 11, 1930. *Ind. Eng. Chem.*, Aug., 1930, pp. 874-78.

[2]E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Crystalline Rubber

CRYSTALLINE rubber has been produced from petroleum at the Bureau of Standards, Washington, D. C. The chemists at the bureau have not yet passed a final opinion on its value but they hope that it will lead to a new and commercially practical source of rubber.

Crude and refined rubber is known to consist principally of hydrocarbons mixed with smaller quantities of various impurities which can be removed only by a series of long and tedious operations. The highly purified rubber resulting from these operations is a transparent, elastic solid as clear and colorless as the best plate glass. The problem of ascertaining the composition of this highly purified rubber has heretofore been exceedingly difficult because of the fact that two of the most useful processes ordinarily employed by the chemist: namely, crystallization and distillation, could not be applied to the material.

A process has recently been developed at the bureau by which pure rubber can be repeatedly crystallized, thus opening the possibility of successfully fractionating it into its constituent hydrocarbons and eventually of determining the formulas of their molecules. The crystalline rubber obtained by this process, as seen under the microscope, consists of small transparent plates that agglomerate into larger and larger clusters. The crystallization process is carried out by cooling a dilute solution of the highly purified rubber dissolved in ether to a temperature of about —80°C.

The bureau has also succeeded in distilling the purified rubber without decomposition, by heating it in a high vacuum to the temperature of boiling water. This distilled rubber possesses all of the common characteristics of ordinary rubber, but the rate of distillation is not sufficiently great to make this process of much practical value for purifying the rubber in any quantity. It can, however, be used for obtaining small samples of distilled rubber.

Research Activities

THE research activities conducted under the auspices of the American Society for Testing Materials cover the work on rubber products as prepared by Committee E-9 on Correlation of Research and comprise the following subjects:

Abrasion Test of Rubber Products. A test being developed for the general application of those rubber products where abrasion in service is the most important element in determining the life of the material, such as conveyer belting, automobile tires, rubber covered air and water hose, rubber heels, etc. (Committee D-11). See preprint, Report of Committee D-11 for 1930 annual meeting.

Life Test of Rubber Products. Accelerated aging test of various types of rubber compound in comparison with natural aging of the same samples (Committee D-11). See preprint, Report of Committee D-11 for 1930 annual meeting.

Flexing Test of Rubber Products. A study of accelerated flexing tests of rubber products, especially of rubber belting under conditions involving the deteriorating influence encountered in actual service. Results are to be correlated with actual service experience (Committee D-11). See preprint, Report of Committee D-11 for 1930 annual meeting.

Shock Absorption of Rubber Products. Study, development and standardization of methods of test which are particularly suitable in the evaluation of rubber stocks for shackles, motor supports, bumpers, and shock insulators (Committee D-11). See preprint, Report of Committee D-11 for 1930 annual meeting.

Peerless Hydrated Lime

Hydrated lime is used to some extent in compounding rubber. For this purpose it is highly important that the material be particularly fine, 99 per cent and 350 mesh. Also for the manufacture of certain types of white rubber products color is very important. These specifications can be met successfully only by special chemical control of the production processes.

Rubber Vulcanized with Trinitrobenzene[1]

ORDINARY vulcanized rubber quickly tarnishes copper, silver, and mercury by reason of its sulphur content. However, when 1, 3, 5 trinitrobenzene is used as the vulcanizing agent instead of sulphur, rubber is obtained which has no apparent action on the above metals. Rubber tubing made with trinitrobenzene has been used in contact with mercury for several months with only slight fouling of the metal. When trinitrobenzene rubber is vulcanized in contact with copper, not only does the metal remain bright, but the aging qualities of the rubber are practically unaffected, quite contrary to the result obtained with sulphur vulcanized rubber under similar circumstances.

In order to ascertain quantitatively the extent, if any, to which copper was attacked by trinitrobenzene rubber, fine wires of known resistance were embedded in the rubber prior to vulcanization. Measurements of resistance made after vulcanization showed a decrease in resistance of about 0.1 per cent, which was probably due to the annealing of the wire. A comparison sample of copper wire, which was vulcanized in contact with a rubber compound containing a low percentage of sulphur and an ultra-accelerator, increased in resistance by 8 per cent. This indicates clearly that any action of trinitrobenzene rubber on copper is negligible in comparison to the effect of the most favorable sulphur-vulcanized rubber.

Trinitrobenzene rubber was also vulcanized in contact with silver, nickel, iron, manganin, advance, and nickel silver. In no case was there tarnish or other indication of attack on the metal.

The trinitrobenzene rubber used in these experiments was made according to the following very simple formula:

	Parts
Pale crepe rubber	100
Zinc oxide, "Kadox" brand	100
1, 3, 5 trinitrobenzene	2
Total	202

The time of vulcanization employed was 60 minutes at 141° C.

Trinitrobenzene rubber may find an important application in the manufacture of electrical insulation by reason of the fact that it may be applied directly to copper without the necessity of tinning the latter. In view of this possible use the electrical properties of trinitrobenzene rubber, made according to the above formula, were determined. The dielectric constant and power factor at 1,000 cycles, 27° C., were 3.84 and 0.006, respectively. These are approximately the same as for sulphur-vulcanized rubber containing the same proportion of zinc oxide. The resistivity was 1.4×10^{15} ohm. cm., which is somewhat less than for rubber vulcanized with sulphur, but adequate for practical insulation purposes.

[1] From *Tech. News Bull.*, Bureau of Standards, Oct., 1930, No. 162.

Rubber Division A. C. S.

New York Group

THE second in the series of New York Group, Rubber Division A. C. S., meetings for the 1930-31 season will be held Wednesday, December 10, at 6:00 P. M. in the Roof Garden of the Park Central Hotel, Seventh Ave. at 56th St., New York, N. Y. Tickets are $2.50 each. Members of the group who expect to attend the meeting should be certain to make early reservation since attendance is limited to 200.

The scientific program comprises a moving picture of the manufacture of carbon black, described by Donald Cranor, of the Binney & Smith Co., and a paper on "Smell in Rubber Goods as a Sales Resistance," by Donald Laird, of Colgate University.

Arrangements have been perfected to make the occasion unusually attractive. There will be souvenirs at each plate, and a selection of useful gifts displayed on a Christmas tree. These will be distributed to holders of tickets bearing the lucky numbers to be drawn for the gifts, which include a variety of articles donated by companies interested as manufacturers of rubber goods or suppliers of materials and equipment for the industry.

This meeting promises to be particularly interesting and pleasurable. Reservations can be made by addressing K. J. Soule, chief chemist, Manhattan Rubber Mfg. Division, Raybestos-Manhattan Co., Passaic, N. J.

Chicago Group

THE Chicago Group will hold the second meeting of its 1930-31 season on December 5, in the Rubber Group Dining Room of the Auditorium Hotel, Chicago, Ill. Dinner will be served at 6:45 P. M. Tickets are $1.50 per plate.

The program for the evening will be a paper by H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc., on "Sponge Rubber," also a paper by F. L. Dawes, Adamson Machine Co., on "Tubing."

These topics were selected as the result of a recent canvass of Chicago Group members, who are urged to make their reservations promptly by application to B. W. Lewis, secretary, in care of Wishnick-Tumpeer, Inc., 365 E. Illinois St., Chicago, Ill.

Subscription Privilege

AN arrangement was made between the committees of the Institution of the Rubber Industry of England and the Rubber Division, American Chemical Society, whereby members of both societies are enabled, at specially reduced rates, to subscribe to each other's journal: namely, the *I.R.I. Transactions* and *Rubber Chemistry and Technology*. Subscriptions for 6 issues of the *Transactions* will be accepted at $4 each from Rubber Division, A. C. S., members by W. F. V. Cox, secretary, Institution of the Rubber Industry, Faraday House, 10 Charing Cross Road, London, W.C. 2, England.

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PLASTICATION OF OILS. I. P. Bary, *Caoutchouc & gutta-percha*, Oct. 15, 1930, pp. 15214-16.

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RUBBER INDUSTRY IN THE UNITED STATES. L. P. Max, *Rev. gén. caoutchouc*, Oct., 1930, pp. 3-6. To be continued.

HISTORICAL DATA ON THE CHEMISTRY OF RUBBER. I. L. Kondakoff, *Rev. gén. caoutchouc*, Oct., 1930, pp. 7-13.

STUDY OF GUTTA-PERCHA AND BALATA BY MEANS OF X-RAY SPECTRA. H. Hopff and G. V. Susich, *Rev. gén. caoutchouc*, Oct., 1930, pp. 23-26. Illustrated.

RATIONAL RESTRICTION OF THE RUBBER OUTPUT. J. G. Fol, *Indische Mercuur*, Oct. 29, 1930, pp. 959-61. Graph, tables.

PRODUCTION OF SYNTHETIC RUBBER BY POLYMERIZING DIOLEFINES. Review of Post-War Patent Literature. M. Pankow, *Kunststoffe*, Oct., 1930, pp. 219-22.

MINERAL BLACK AS REENFORCING FILLER. P. Schidrowitz and M. Philpott, *Kautschuk*, Oct., 1930, pp. 204-07. Conclusion. Tables, graphs.

BEHAVIOR OF HIGH POLYMEROUS SUBSTANCES IN SOLUTION. H. Mark, *Kolloid-Z.*, Oct., 1930, pp. 32-46. Graphs, illustrations.

DEFORMATION OF HIGH MOLECULAR COMBINATIONS. R. O. Herzog, *Kolloid-Z.*, Oct., 1930, pp. 46-51.

CONSTITUTION OF RUBBER. R. Pummerer, *Kolloid-Z.*, Oct., 1930, pp. 75-78.

MICRO MANIPULATIONS OF LATEX IN DARK FIELD. E. A. Hauser, *Kolloid-Z.*, Oct., 1930, pp. 78-82. Illustrations.

THERMODYNAMICS OF LYOPHIL COLLOIDS. H. Kroepelin, *Kolloid-Z.*, Oct. 1930, pp. 86-88.

ACTION OF SOLVENTS IN RUBBER. P. Stamberger and C. M. Blow, *Kolloid-Z.*, Oct., 1930, pp. 90-95. Graphs, diagrams.

TERMITES ATTACKING HEVEA BRASILIENSIS IN CEYLON. F. P. Jepson, *Trop. Agr.*, Sept., 1930, pp. 143-56. Illustrations.

COMMON PESTS AND DISEASES OF YOUNG HEVEA BUDDINGS. *Trop. Agr.*, Sept., 1930, pp. 159-61.

Zinc Oxide Vulcanizing Product

A voluminous product having a basis of zinc oxide, said to be especially useful in rubber vulcanization, is prepared by treating complex Zn-NH_4 salts with an alkaline bicarbonate.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1308	Manufacturer of flesh colored rubber gloves for artificial left hands.
1309	Where can samples of Taka and Tulex be obtained? Is there an agent in the United States for these products?
1310	Manufacturer of rubber nipple used in pacifiers.
1311	Manufacturer of seamless advertising balloons.
1312	Manufacturer of No. 606 high pressure steam packing.

Technical Communications

Ultra-Micronex

IT IS a demonstrated fact that with Ultra-Micronex in place of standard Micronex, it is possible to reduce vulcanizing time or alternatively to reduce the accelerator dosage and thus effect economy in compounding costs. Data substantiating these claims have been published for cures at 274° F. and 288° F., namely 30 and 40 pounds' steam pressure. This advantage is maintained when ultra-accelerators are used in low temperature cures.

Test Formula	
Rubber	100.00
Sulphur	3.00
Captax	0.75
Stearic acid	3.00
Zinc oxide	7.50
Carbon black	38.25
	152.50

This stock, when containing Ultra-Micronex, reached optimum cure in 75 minutes at 250° F.; but when containing standard Micronex, it required 100 minutes to reach the same state of cure. At 298° F. the optimum cure was attained in 15 minutes when Ultra-Micronex was used and in 20-25 minutes when the stock contained standard Micronex.

While Ultra-Micronex makes possible substantial savings in accelerator cost throughout the entire range of curing temperatures, it is particularly suited for use in low temperature cure, giving all its advantages without the necessity of making the cures unduly long. Data from Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

Machining Hard Rubber

HARD rubber may be sawed with hack saws, band, or circular saws, but a grinding wheel accomplishes the purpose to better advantage and gives a smoother cut.

Band saws .035-inch thick by ⅞-inch wide, 5 points per inch running at about 3,400 feet per minute, give good results.

Circular saws are recommended for sawing very small rods and tubes. These saws should be .025-inch thick and 3 inches diameter with 14 to 20 teeth per inch, and they should be run at about 2,200 r.p.m. Teeth of circular saws require no set.

Grinding wheels used for sawing, range from 8-inch diameter by 1/16-inch thick, up to 14-inch diameter by ⅛-inch thick. These wheels operate at 4,800 r.p.m. and 3,200 r.p.m. respectively. Open grain wheels cut quicker and do not glaze as much as close grain type.

For cutting, knife edge, hand, or power operated shear can be used. Some hard rubber sheet stock may be cut cold, while other stock must be heated on a steam table until flexible. The grade and thickness of the hard rubber sheet must be considered. Pieces cut from hot sheet should be laid on a flat surface until cool.

Hand punches or knife edge power punches can be used for punching. As in cutting, some grades can be punched cold, while others require heating.

Grinding can be done wet or dry; the wet process gives better finish. This work can be done with cylindrical or disk grinders. Rods and tubes are generally ground wet in a centerless grinder unless it is necessary that the hole in the tube be centered with the outsde diameter.

Polishing wheels of flannel give good service and are usually operated at about 1,500 r.p.m.

Hard rubber slab is generally furnished with both sides polished in sizes from .005-inch to 7 inches in thickness and of various lengths and finishes. Data from American Hard Rubber Co., New York, N. Y.

Auto Top Finish

NEW varnishes for finishing auto top fabrics designated as 639 First Coater and 639 Gloss Vulcolac are now available. When used in the proper way, these preparations produce a very durable glossy surface over rubber coated auto top textile goods. In many sections of the country endurance tests on Gloss Vulcolac by out-of-door exposure on auto topping demonstrated that this material maintains its luster to a marked degree. Data from Monroe Sander Corp., Long Island City, N. Y.

Function of Softeners

WHEN crude rubber is compounded with carbon black alone it resembles a semi-cured stock. It does not mill smoothly but tends to break up like a scorched stock and loses plasticity with increases in carbon black content. The modulus of such a stock resembles that of vulcanized rubber, and the uncured stock is insoluble in rubber solvents even in the absence of sulphur. Such mixtures are obtained prior to complete incorporation and are too dry to absorb carbon black readily. Large aggregates formed in mixing are soon broken up into smaller ones, which are mechanically stirred; but lacking adherence to the dry batch, are not progressively absorbed. If, however, Pigmentar is included as a dispersing medium the excessive dryness of the batch is overcome and the incomplete carbon black mix has still a capacity for wetting unincorporated carbon black. But this is not the only principle involved. Pigmentar has also a softening effect on rubber. The use of too much softener would increase the ability of the rubber to absorb carbon black but would also decrease the stiffness of the mix with a loss of shearing or mixing action on the aggregates.

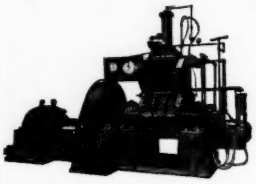
Dispersing mediums or softeners are effective because of their action on the rubber rather than on the carbon black. This action consists of maintaining the ability of the compounding rubber to wet carbon black. Furthermore dispersing mediums maintain the coherent properties of the mass and thereby transmit the shearing forces through it instead of limiting it to the areas of roll contact. Data from E. W. Colledge, Jacksonville, Fla.

Airwheels for Airplanes

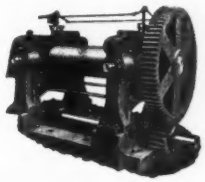
THE rapidly increasing importance of transportation by air has stimulated intensive study and development of improved construction and equipment of heavier-than-air craft. The necessity for the maximum cushioning effect is evident when one realizes that an airplane weighing from 1,000 to 10,000 pounds lands at speeds of from 40 to 60 miles per hour. To afford the greatest cushioning effect possible the airwheel has been perfected.

The airwheel is a tire of extremely large air volume designed to operate at air pressures ranging from 5 to 15 pounds. It has a large sectional width in proportion to its over-all height and has a proportionately small hub diameter. It is of the straight side bead construction composed of patented supertwist cord plies processed with plantation rubber compounded to produce the longest life in the service for which it is intended. The tread is of highest quality and possesses sufficient thickness to provide for wear without adding excessive weight. The large contact area of this tire apparently possesses sufficient traction for braking without a non-skid design, which would add weight and increase wind resistance.

The airwheel is mounted directly on a hub, no wheel is required. The hub is composed of a light weight thin steel shell on which are mounted aluminum alloy side flanges. The shell also supports the axle bearings equipped with Zerk fittings for occasional lubrication. The side flanges are provided with corrugations which match those molded into the bead of the tire and which prevent the tire turning on the rim due to torsional stresses. The side flanges are held by a lock ring, which both holds them from turning and prevents them from coming off endwise. This lock ring is easily removable when it is necessary to change a tire. A tire change may be made without removing the hub from the axle or, if a tire is available already mounted on a hub, the whole assembly may be quickly and easily interchanged. The hub is provided with a stream lined hub cap which covers the valve stem, thus keeping out dirt and preventing possible snagging. This cap is of a snap on type and is easily removable for the purpose of inspection or inflation of the tire. The same description applies whether the hub is used with or without brakes, although the two hubs are not interchangeable. When the Airwheel is used as a tail wheel, no hub cap is provided. Data from The Goodyear Tire & Rubber Co., Akron, O.



New Machines and Appliances



Tire Nesting Molds

WHILE the watch case tire vulcanizing equipment has distinct technical and economical advantages over the earlier hydraulic press vulcanizer, a special form of tire heater has been perfected as a competitor to the watch case vulcanizer. Its general construction and mode of operation is indicated in the part sectional vertical view shown in the illustration.

The autoclave is built to receive a group of three specially designed, nested molds, which are constructed on the radiator principle and are hollow in elliptical cross section. Thus the molds have great internal surface swept by steam at high velocity, giving rapid heating and cooling effect. The steam flows in a serpentine path through the stack of molds, and rapid heat exchange thus results in quick vulcanization.

The nest of molds is held together by four spaced turnbuckles and are handled into and out of the heater by an overhead electric hoist. The molds are of steel throughout, machined all over, accurately interchangeable, and may be stacked in any number from three to twenty as required. Nesting giant tire mold equipment saves 60 per cent in weight.

The vulcanizers are located in the center of the stripping benches and are served by an overhead electric hoist so that on completion of a cure the first unit is lifted and placed to the left and a second unit to the right. Two loaded units are then picked up successively and deposited in the heater press, which is then closed.

The actual time of change from blow-off to full head of steam up is four minutes. The radiator-like design of the molds allows rapid heating and cooling; thus cooling by water can be dispensed with. The turnbuckle bolts are handled by two men. When the top mold shell is removed, it is turned over and becomes the bottom of the next assembly; the other parts are simply slid over by the electric hoist. J. A. Spencer-Smith, Winnersh, Wokingham Berks, England.

Compound Storage Bins

OVERHEAD or second story storage bins for dry compounding powders are in common use for convenient and clean weighing of batch ingredients. Free and unhindered discharge of such stored material is assured by the arrangement of chutes and control gates. Groups of these chutes and bins are arranged, as pictured, to suit plant conditions, and supply storage capacity for individual ingredients according to requirements.

These storage bins and chutes are built of sheet metal and are placed so that the material will pass out freely at the leak-proof end gates. The storage bins require no poke rods, no electric vibrators, nor hammer pounding on its sides to start the contents; consequently the bins are always in good working condition. An air line is extended up into the bin along its sloping bottom. There is no continuous flow of air into the bin to cause excessive dusting, only an occasional puff of air is needed to make material flow freely.

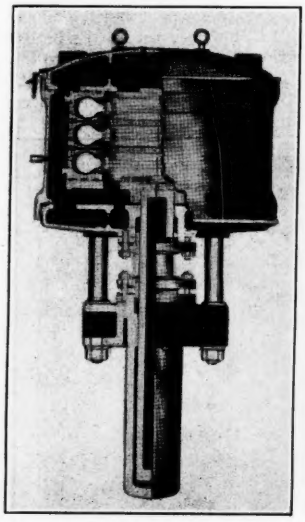
The gate at the bottom of each bin is the solution to all flowing, flushing, flooding, and leakage problems. It is of swinging type with a stop plate. Along the four sides at the bottom of the chute a heavy duty double bristle brush with reenforcement is fitted in place. Swinging the gate open permits flow of material through the center of the chute only. When closing the chute, the brushes sweep across the blade of the gate cutting off the flow instantaneously and effecting an absolutely dust tight joint. Richardson Scale Co., Clifton, N. J.

Roller Chain Transmission

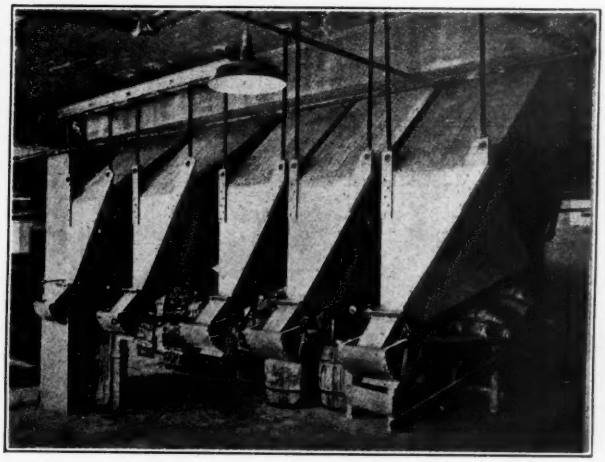
THE accompanying illustration represents a high speed roller chain attached to a calender for power transmission. The drive is quadruple-strand, one-inch pitch chain, 5/8-inch wide at the rollers. The driver has 17 teeth, and the sprocket 145 teeth, 50-inch centers. The drive is cased and is lubricated by the chain dipping into the oil and then spraying over the chain.

All of the chain contacts are rolling contacts, since each link is a roller bearing. Only four parts are in each link. The construction permits the contact parts to be treated for utmost resistance to wear. Their durability is not compromised for tensile strength, and all parts of the chain are as carefully machined as any precision tool.

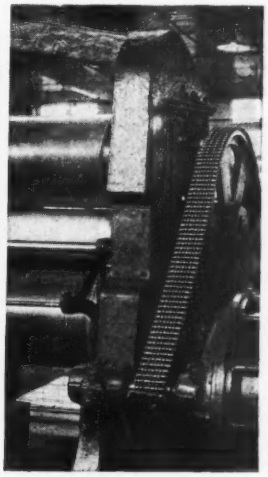
These characteristics make this chain 98.99 per cent efficient up to 3,600 r.p.m., up to 672 h.p., and have won acceptance for it in over 100 major divisions of American industry where economy, efficiency, and freedom from trouble are valued to the utmost. Diamond Chain & Mfg. Co., 433 Kentucky Ave., Indianapolis, Ind.



Sectional View of Vulcanizer



Richardson Storage Bins and Chutes



Diamond High Speed Chain

Rubber Truck

THE usual custom of transporting rolls of sheet rubber and fine calendered work on the ordinary two-wheel hand truck is very liable to cause injury to the uncured stock. The truck pictured in the illustration is specially designed for moving such sheet materials in rolls from calender to cutting or make-up rooms with no possibility of injury.

The angle iron rack is made rigid by simple fore-and-aft bracing. On each side of this superstructure are brackets to hold the roll rods. This arrangement gives capacity for handling 6 rolls 24 by 50 inches.

The truck construction is all steel, arc-welded. The running gear in front consists of two 8-inch service swivel casters and in the rear of two 10-inch wheels. Hyatt roller bearings are used throughout. In front the truck is provided with a hinged hook to permit use as a trailer. Lewis-Shepard Co., 125 Walnut St., Watertown Station, Boston, Mass.

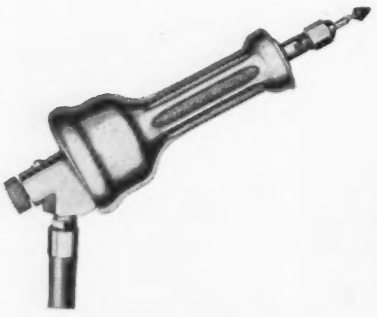
Sheet Rubber Trailer Truck

Air Grinders

A HIGH speed model air grinder of the type represented in the illustration is especially useful in the mold making departments of rubber factories as well as in their pattern and tool rooms.

This grinder is built in three new ball bearing high speed models. They operate at the remarkable speeds of 60,000 to 100,000 r.p.m. Model BBL is a low pressure grinder, designed to develop 60,000 r.p.m. on 30 to 50 pounds' air pressure. Model BB also operates at a speed of 60,000 r.p.m. but requires pressures of 50 to 100 pounds. Model BB-100 requires 100 to 120 pounds of pressure, and operates at the speed of 100,000 r.p.m. Each of the models is small enough to be held in the hand, like a fountain pen.

To reduce the friction incident to these high speeds these machines are equipped with ball bearings at both top and bottom. Lubrication is through the spindle, which is hollow and cross-drilled with 1/32-inch holes. The oil is introduced at the end of the hollow spindle by means of a syringe oiler; centrifugal force delivers it to the bearings through the holes in the spindle. These new models complete the line of air grinders first put on the market at the beginning of this year. Madison-Kipp Corp., Madison, Wis.



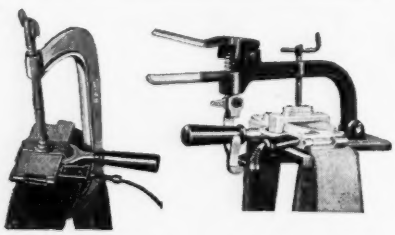
Madison-Kipp Air Grinder

Electric Spot and Tube Vulcanizer

AN electric combination spot and tube vulcanizer is offered as a new cure for an old trouble. This device is pictured as a spot heater and applied for vulcanizing a cut on the tread of a tire without removing it from the rim. It was perfected for repairing surface cuts, blisters, and sand pockets of tires without removing them or letting out the air from them. It pays to repair such injuries before they get deep enough to allow water to penetrate to the cords, rotting them and causing a blow-out.

Vulcanization with this device is easily done by simply plugging it in at a light socket. Any person can do the work. One needs only to clean out the cut to be repaired, fill it with raw vulcanizing compound, then clamp the portable heating device over the repair and apply the electric current for 25 minutes, and the job is well cured.

The automatic temperature control holds the heat at the correct vulcanizing point during the curing. With this tool vulcanizing a spot on a tire is just as simple as making a similar repair on an inner tube. In fact, this vulcanizer with 2 or 3 tools and a small supply of repair material is all that is required for this work. In addition to its use as a spot vulcanizer it needs only the addition of a high-grade single-clamp "speed" tube plate to cure a tube repair with 8 minutes' heating. The illustrations show the tool as applied for spot vulcanizing and as equipped for doing similar work on inner tubes. The Shaler Co., Waupun, Wis.



Spot Heater Tube Heater

Shaler Spot Vulcanizers

A New Bearing Metal

A NEW bearing metal in the form of a self-lubricating bearing has recently been invented. It can also be used with lubricant instead of the present oil-requiring bearing materials. If the supply of lubricant should become inadequate, the bearing will resist the heat of friction for a considerable time by means of its own lubricating qualities. The process of manufacture is very simple.

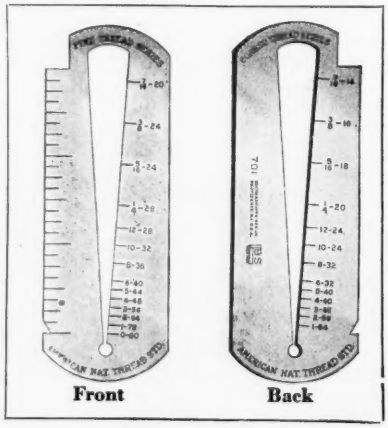
The bearing is made by mixing one or more metallic powders with one or more materials yielding a soapy substance. The ingredients are put in a cold mold and subjected to a pressure of approximately 40,000 pounds per square inch. The temperature is gradually raised until it reaches about 400° F. After keeping the mold at this temperature for half an hour, the pressure is raised to 200,000 pounds per square inch. The pressure is then released and the mold allowed to cool. After this the finished bearing is removed from the mold.

Bearings of this new material can either be made to certain specifications according to the mold used or they can be made in blank and machined to the size desired. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Standard Screw Gage

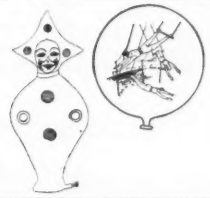
THE American National standard screw gage No. 701, which has been recently announced, is a handy gage for determining screw threads according to the American National and United States screw thread standards.

One side of the gage is graduated for the fine thread series and the other side for the coarse thread series. A 3-inch scale graduated in eighths is provided on one outer edge of one side. This allows the length of screws to be determined. Slots at either end of the scale permit the heads of both round and flat-headed screws to be set against a positive stop, when measured. Brown & Sharpe Mfg. Co., Providence, R. I.



Gage No. 701

New Goods and Specialties



Filler and Drainer for Washing Machines

HERE is a wash-day necessity that will prove a boon to those who do their laundry at home. It is known as the Scott filler and drainer, and is used for filling and draining tubs and washing machines. It is equipped with molded white tubing five feet long made especially for use with scalding hot water, and operates three times faster than a siphon.

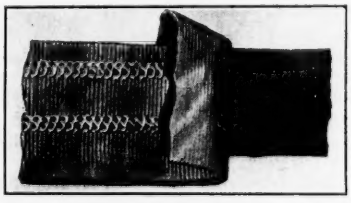
To fill the tub or the machine, connect the drainer to both the faucets and turn on the water as desired. To empty tub or machine, connect the drainer to the cold water faucet only and turn on the water. Draining is accomplished by suction under water pressure as low as 15 pounds. Where pressure is low, squeeze the short hose to start immediate suction. To prevent splashing of water when draining, place the end of the short tube in a quart bottle or a jar resting in the sink. The drainer can be used on the new combination faucet having only one outlet by placing a plug or cork in either one of the couplings when filling.

This device has been tested and approved by the institutes of *Good Housekeeping, Modern Priscilla,* and *The Herald-Tribune.* Scott Pump Co., 645 Atlantic Ave., Rochester, N. Y.

Nobelt Waistband

THE Nobelt waistband is a patented rubber elastic band applied to pajamas. It is a substitute for the old style binding draw strings. Its construction is shown in the illustration. A broad flat band of vulcanized new live sheet rubber is encased in resilient webbing attached with expanding stitching. The sheet rubber gives equal resilience to the entire band, and the rubber is under no tension until the garment is fastened by a single button around the waist.

This results in a uniform and gentle pressure that can scarcely be felt by the wearer. The rubber is protected from deterioration by the presence of an anti-oxidant in its composition. The Faultless Mfg. Co., Baltimore, Md.

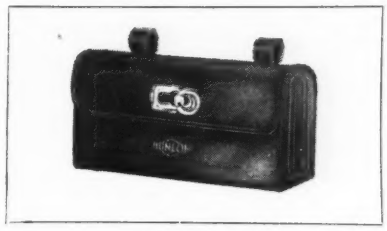


Nobelt Rubber Waistband

New U. S. Golf Ball

GOLFERS who want a ball which they cannot cut and which will last until lost will welcome the new golf ball now being marketed by the United States Rubber Co., 1790 Broadway, New York, N. Y. This recent addition to the U. S. family is known as U. S. (True Center) 444, and is shown in the accompanying illustration. The manufacturer claims this product is as nearly cut-proof as is possible for a ball to be. In any ball, resistance to cutting depends on the winding under the cover, not on the cover itself. For looser winding lets the cover "give" and makes it harder to cut. With this principle in mind, the rubber company has wound the 444 looser than its other balls. Thus, it offers the utmost resistance to cutting, with a negligible loss in distance. It has, furthermore, the trueness of putting and flight that are characteristic of the U. S. True Center construction. This ball is made in the mesh or recess marking, in plain white or with colored dots, and in both the new 1.68 or the present 1.62 sizes.

U. S. (True Center) 444



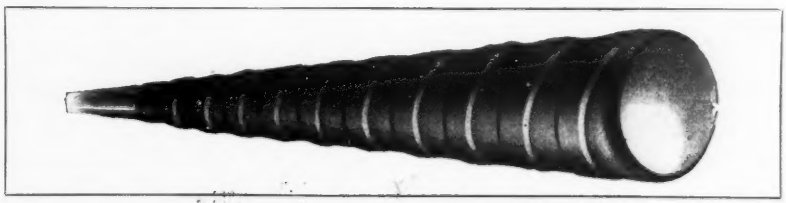
Tool Kit

Waterproof Saddle Bag

WORKMEN'S tools often are damaged by rain and dampness because the tools are carried carelessly or are unprotected. Then too, tools packed in a neat and convenient case are not easily lost. Such a useful kit, as shown in the accompanying illustration, is manufactured by Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham, England. This waterproof bag was designed especially for saddles of bicycles, motorcycles, etc. It is made from an oil-resisting rubber compound molded to shape. The straps for affixing the bag on the saddle are reenforced with canvas and securely riveted. Edges and corners are rounded. The surface of the bag may be varnished or otherwise treated to enhance its appearance. The bag measures 6½ by 3 by 1⅜ inches.

Golf Club Grip

GOLFERS have long awaited a grip which would live up to its name in wet weather. This new rubber grip, here illustrated, designed by Ernest R. Whitcombe, noted British golfer, and used on all his clubs, according to its manufacturer, fulfills this condition. It is claimed that this grip never slips, does not chafe or blister the hands, and dispenses with the necessity for grip wax. The Avon India Rubber Co., Ltd., 343-5 Euston Road, London, N. W. 1, England.



Whitcombe Grip, Non-Slipping in All Weathers

Editor's Book Table

Book Reviews

"A. S. T. M. Specifications and Methods of Test for Textile Materials, 1930." Prepared by Committee D-13 on Textile Materials. Authorized Reprint from the Copyrighted Publications of the American Society for Testing Materials, Philadelphia, Pa. Paper, 122 pages, 6 by 9 inches. Price 80 cents.

This pamphlet embodies specifications covering a wide range of textile materials. It contains Tolerances and Test Methods for Cotton Yarn and Sewing Threads, Light and Medium Weight Cotton Fabrics, Tire Fabrics and Tire Cord, Electrical Silk and Cotton Tapes, Asbestos Yarn and Tape, Rayon, Knit Goods; Tolerances for Numbered Cotton Duck, Hose and Belt Ducks, Tire Cord; Methods of Testing Woven Fabrics; Specifications for Testing Machines, Chafer Tire Fabrics, Cement Sacks, Sugar Bags; and Definitions of Terms Relating to Textile Materials.

These specifications have been developed by collaboration of producers and consumers of textile materials, assisted by representatives of government bureaus, testing laboratories, and manufacturers of testing equipment. They represent best methods known at present and are revised from time to time as knowledge of textile materials advances.

"Cotton Fabrics and Their Uses." Revised and published by U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. For sale by the Superintendent of Documents, Washington, D. C. Five Cents.

This is a comprehensive survey of the different types of cotton fabrics manufactured, the uses of each fabric, and of the uses of cotton by various industries and professions. It is divided into two parts, each of which consists of two lists. List No. 1 gives alphabetically the names of these fabrics (approximately 200) about which information has been obtained; List No. 2 gives under each fabric a general description thereof and its various uses; List No. 3 gives the names of articles made in whole or in part of cotton, without reference to their uses, and lists the articles of cotton uses by various industries and professions; List No. 4 gives under each use the fabrics used therefor.

"Change of Electrical Properties of Rubber and Gutta Percha during Storage under Water." By Harvey L. Curtis and Arnold H. Scott. Research Paper No. 213. Reprint from Bureau of Standards *Journal of Research*, Vol. 5, September, 1930. For sale by the Superintendent of Documents, Washington, D. C. Price 10 cents.

The results of long continued tests are presented by the authors in the hope that they may be of service to others who are contemplating similar investigations.

"The United Kingdom." An industrial, commercial, and financial handbook. By Hugh Butler, American Trade Commissioner, and Officers of the United States Department of Commerce and Department of State. United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Government Printing Office, Washington, D. C. Cloth, 953 pages, 6 by 9 inches. Indexed. Illustrated. Price, $1.75.

This volume, No. 94 of the Trade Promotion Series, amply justifies the belief of those concerned in its compilation that the work is "one of the most comprehensive volumes of its kind ever issued by a government bureau."

In scope and accuracy the work leaves nothing to be desired by readers interested in the status of industry, commerce, agriculture, finance, insurance, markets, etc., of the United Kingdom. These and other features of business life in Great Britain and northern Ireland are of inestimable value for Americans desirous of selling in the British markets. The chapters on "Living in the United Kingdom" and "General Information" are of special individual interest and value to strangers.

"A. S. T. M. Tentative Standards 1930." American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Paper or cloth, 864 pages, 6 by 9 inches. Indexed. Illustrated.

This volume contains 155 tentative standards of which 24 relate to rubber products, insulating materials, and textile materials. The term "Tentative Standard" as distinguished from "Standard" is applied to a proposed standard which is printed for one or more years with a view of eliciting criticism, of which the committee concerned will take due cognizance before recommending final action toward the adoption of such tentative standards by formal action of the Society.

Legal

John F. Allen, J. A. Himrod, Edward E. Allen, and Continental Rubber Works vs. Bay State Iron Works, E. L. Burch, and R. L. Burch. Circuit Court of Appeals, Third Circuit. On appeal from District Court for the Western District of Pennsylvania.

Judge Wooley finds that U. S. patent No. 1,549,177 issued to John F. Allen for apparatus designed to mold articles of rubber and used chiefly in making battery boxes for automobiles, is not infringed by the defendants and affirms the decree of the district court.

New Publications

"Schrader Tire Valves—Tire Gages—1930." A. Schrader's Son, Inc., Brooklyn, N. Y. This noteworthy catalog of an internationally known corporation comprises 133 pages of profusely illustrated descriptions of Schrader tire valves in great variety, as well as service devices, airbag valves and parts, also valves and fittings for rubber goods. The book is substantially bound in flexible covers, and the pages are thumb indexed for ready reference.

"R & H Chemicals for Rubber." The Roessler & Hasslacher Chemical Co., 10 E. 40th St., New York, N. Y. A set of notes in a flexible loose-leaf binder of pocket size, is descriptive of the four classes of accelerators of vulcanization manufactured for the rubber industry by the R & H company. The notes are illustrated by many charts indicating the characteristic effects of the materials described. A special section is devoted to the properties and uses of R & H 40 accelerator of the aldehyde amine class of special suitability for use with various compounding ingredients and reclaims in rubber mixings for different purposes.

"World Cotton Belt—Cotton Industry—Producer to Consumer." Harriss & Vose, 60 Beaver St., New York, N. Y. This chart was prepared from data and material supplied by the United States Department of Agriculture, United States Department of Commerce, Federal Farm Board, and New York and New Orleans Cotton Exchanges. It displays graphically the data of production, consumption, and commerce in raw cotton for 1929-1930. The chart is bordered by thirty-nine views illustrating the stages through which cotton passes from the cotton planter to the consumer of cotton goods.

"Tapis de Caoutchouc (Rubber Carpets)." Societe Industrielle des Telephones, 25 Rue du Quatre Septembre, Paris, France. A brief review of the company's development is followed by a discussion of the many advantages of rubber carpets, the part they play in decorative schemes, and the proper way to care for them. There are several handsome illustrations, some in color, of various products of the company. At the end is a list of the many concerns and institutions which have obtained rubber flooring from the firm.

"Rubber Mill Machinery." Wm. R. Thropp & Sons Co., Trenton, N. J. This copiously illustrated catalog is devoted to descriptions of safety devices and gear guards for in-running rolls, especially adapted for mills, calenders, crackers, washers, refiners, and paper calenders. Testing apparatus consisting of electrically and mechanically operated pencils, are illustrated and described. These pencils are used for recording the travel of a roll after the overhead safety lever has been pulled.

The Thropp safety appliances are approved by the State of New Jersey Labor Department.

The Rubber Industry in America

OHIO

The Firestone Tire & Rubber Co., Akron, O., through its board of directors has authorized immediate building of a tire factory in Argentina, with a daily capacity of 1,000 tires and tubes. This decision follows the recommendation of Vice President Harvey S. Firestone, Jr., who recently completed a twelve-week trip in South America. H. R. Baker, former advertising manager of the Miller Tire & Rubber Co., Akron, has joined the Firestone advertising staff. On November 13 and 14 Firestone branch managers and sales executives attended a conference at the home office. L. R. Jackson, vice president in charge of sales, was the principal speaker. On the second day Vice President J. W. Thomas gave a short sales talk. The concluding address came from President Harvey S. Firestone, Sr. Included among the visitors were C. E. Speaks, vice president and general manager, Firestone Footwear Factory, Hudson, Mass.; R. J. Cope, vice president and general manager, Los Angeles, Calif., factory; and E. E. BeSaw, president of the Canadian Firestone company.

The B. F. Goodrich Co., Akron, O., last month entertained three visiting officials: Col. David M. Goodrich, chairman of the board of directors; Sir Walrond Sinclair, manager of the English plant; and W. W. Martin, in charge of the French organization. Goodrich officials, in commenting on the recent increases in tire and tube prices, stated that such changes would only slightly affect their company, for Goodrich made no change last June when other major tire companies reduced their prices.

The Seiberling Latex Products Co., Barberton, O., maker of the Hornet golf ball, now also makes No. 333, a new ball especially for miniature putting courses. This ball is said to have plenty of life. It comes in white, red, blue, and orange, in the 1.62 size only.

General Tire Chains

A successful test was recently made of rubber tire chains of the General Tire & Rubber Co., Akron, O., on a White one-ton truck with 32 x 6 tires. The chains were run for 1,070 miles on dry pavement without being removed from the wheels. Although the tread showed some wear, most of the non-skid design on the cross links remained, and the chains appeared to be good for at least another thousand miles. The Perfection chain, incidentally, is the only steel-wire reenforced rubber tire chain on the market.

An advantage of rubber tire chains is the fact that they can be placed over the wheel at the beginning of the winter season and left on throughout the period.

C. C. Gehring

The United States Rubber Co., Tire Department, Detroit, Mich., recently established a district office at 41 W. Spring St., Columbus, O., to serve in the sale of tires in sixty-five counties of Ohio, Kentucky, and West Virginia. All orders will be handled directly through Columbus and shipments made from the warehouse there. C. C. Gehring, who has been appointed Columbus district manager, won a wide acquaintance in the tire trade throughout the Ohio section as manager of the Cleveland district for many years. Now the Huntington, W. Va., and Columbus branches come under his direction. He has been with the company since 1906.

Goodrich Silvertown, Inc., retail division of The B. F. Goodrich Co., Akron, O., through its company-owned stores is marketing the all-electric, full-tone, midget-size, screen-grid radio known as the Mantola. It is a five-tube unit with dynamic speaker. The set is manufactured in a small independent factory.

Mantola Radio

Seiberling Rubber Co., Akron, O., has appointed James L. Maloney, former assistant advertising manager, advertising manager to fill the vacancy created by the resignation of Frank R. Griffin.

E. B. Curtis, sales manager of the Naugatuck Chemical Co., 1790 Broadway, New York, N. Y., recently made a business trip to Akron, O., and while there attended the Akron Group meeting.

The Rainbow Tire & Rubber Co., with offices at 31 E. Town St., Columbus, and a plant at Delaware, both in O., through a reorganization is assured continued operations at the plant.

The Dayton Rubber Mfg. Co., Dayton, O., through President J. A. MacMillan, announced the completion of negotiations with The Roderwald Co., Berlin, Germany, for the manufacturing and the distributing rights in North, South, and Central America of the new and revolutionary V-shaped Link-Wedge belt.

Walter Scheffler, Akron representative of Utility Manufacturing Co., Cudahy, Wis., is now at 218 Locust St., Akron, O. Telephone, Hemlock 5463.

India Tire & Rubber Co., Akron, O., has promoted G. H. Callen to the post of export manager. For the past four years he had been assistant export manager and previous to that time had held similar positions in Akron.

The General Tire & Rubber Export Co., Akron, O., according to Vice President H. G. Lubke, has appointed Joseph A. Andreoli director of European sales in the export department of The General Tire & Rubber Co. He will be located at the company's general offices in Akron but will spend part of his time each year in Europe. For ten years Mr. Andreoli has been connected with the export departments of Akron rubber companies.

The Electrical Maintenance Engineers' Association at a recent meeting in Akron, O., elected E. J. Del Vecchio, of the Firestone Steel Products Co., Akron, president. Members on the electrical committee include the following rubber men: O. J. Cummings, of The Firestone Tire & Rubber Co.; Thomas Lowe, General Tire & Rubber Co.; H. W. Tittle, The B. F. Goodrich Co., and W. F. Weiler, Falls Rubber Co.

V. A. Cosler, for thirteen years technical superintendent in charge of the mechanical goods department at The B. F. Goodrich Co., Akron, O., resigned, effective December 1, to become technical superintendent of the Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y. On November 18 about 200 employes of the mechanical division assembled in the company diningroom for a testimonial dinner for Mr. Cosler, who was presented with a watch as a remembrance.

MIDWEST

Rubber Section N. S. C.

At the annual meeting of the National Safety Council the following were elected officers and executive committee members of the Rubber Section:

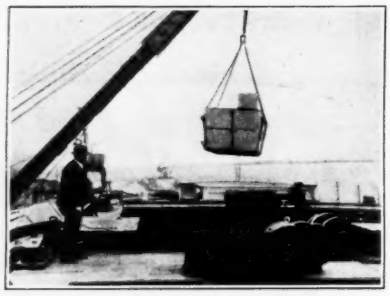
General Chairman, E. R. Lawler, Woonsocket Rubber Co., Woonsocket, R. I. Vice Chairman, C. L. Hungerford, Firestone Tire & Rubber Co., Akron, O. Secretary, J. R. Hanson, United States Rubber Co., Detroit, Mich. Chairman Poster Committee, R. Kastell, United States Rubber Co., Passaic, N. J. Chairman Program Committee, M. A. Quirk, United States Rubber Co., Detroit. Chairman Membership Committee, W. L. Schneider, The B. F. Goodrich Co., Akron, O. Chairman Publicity Committee, R. A. Bullock, Corduroy Tire Co., Grand Rapids, Mich. Chairman Statistics Committee, H. W. Low, Miller Rubber Co., Akron. Chairman Health Committee, Dr. J. N. Shirley, Hood Rubber Co., Watertown, Mass. Chairman Engineering Committee, C. B. Mitchella, Republic Rubber Co., Youngstown, O. Chairman on Slides and Safety Kinks, T. G. McKenna, Goodyear Tire & Rubber Co., Akron. News Letter Editor, A. P. Regal, The Philadelphia Rubber Works Co., Akron.

Members Executive Committee: J. T. Kidney, Goodyear Tire & Rubber Co., Akron; E. W. Beck, U. S. Rubber Co., Passaic; H. T. Martin, Fisk Rubber Co., Chicopee Falls, Mass.; M. A. Quirk, U. S. Rubber Co., Detroit; W. L. Schneider, The B. F. Goodrich Co., Akron.

A. Schulman, Inc., dealer and broker in crude and scrap rubber, has announced its new office address as 422 West Town Bank Bldg., 2400 W. Madison St., Chicago, Ill.

National-Standard Co., Niles, Mich., manufactures flat wire braids for reenforcing straight side tire beads, and this product is also most satisfactory for strengthening high pressure hose for rotary drilling and other purposes.

The United States Rubber Co. at its convention of district managers in Detroit, Mich., on October 27-30, adopted a policy of giving dealers a larger gross profit through immediate discount rather than bonus after a certain volume has been sold. Managers from the company's forty districts, covering the entire country, met with General Sales Manager L. M. Simpson to discuss from all angles improving selling methods. The General offices in Detroit have been reorganized in the interest of further economy and efficiency. They have been consolidated into five major departments, as follows: Operating, in charge of J. C. Ray; Automobile and Truck Tire Sales, in charge of H. N. Hawkes; Advertising, in charge of G. N. Walker; Airplane, Bicycle, and Sundries, in charge of A. K. Dill; Special Brand Automobile Tires, in charge of Page Noll.



Rubber Being Unloaded at Detroit for the U. S. Rubber Co.

Recently a substantial quantity of rubber was received in Detroit by all-water shipment from the land of its growth. This rubber came via New York, Erie Canal, Buffalo, and D. & C. steamers. It was a part of the 1,800 tons which have been received by boat during the last five months. In this period the U. S. Rubber Co. has received a boat shipment practically every day. The majority of these shipments were collected in New York, after transfer from ocean-going freighters. The first rubber ever received here by boat by the United States Rubber Co. was delivered on May 20 when the *Empire State,* a motor boat of the Sea Board Great Lakes Corp. line, docked with 270 tons. The *Empire State* cleared from New York. Every week since then a barge load, averaging about 2,000 cases, has left New York for Buffalo, where the cases are transferred to D. & C. steamers going to Detroit.

N. T. D. A. Meeting

The National Tire Dealers Association held its eleventh annual convention at the Hotel Sherman, Chicago, Ill., November 3-6. Problems confronting the independent tire dealer formed the major topic of the meeting.

Three outstanding tire manufacturers also made addresses. William O'Neil, president of the General Tire & Rubber Co., Akron, O., examined the future of the exclusive tire store and of the independent and the factory-owned store. While Harvey S. Firestone, Sr., president of the Firestone Tire & Rubber Co., Akron, explained his company's policy in establishing diversified service stations, and referred to some of the merchandising problems confronting the industry. Samuel Woolner, Jr., president of The Rubber Manufacturers Association, Inc., and of the Kelly-Springfield Tire Co., Cumberland, Md., remarked on conditions leading up to the present situation in business in general and the tire industry in particular. Mr. Woolner believes that current changes in the form of competition should make the tire business stable and profitable for both dealers and manufacturers.

Election of officers resulted in the following: president, Martin J. Barry; first vice president, A. L. Glick; second vice president, H. A. Runhke; secretary and treasurer, George J. Erlinger. New directors include H. B. Harper, J. Williams, G. Dewald, M. Katz, F. Casazza, J. H. Walsh, and H. Wood; while the holdover directors are L. A. Brown, A. Goldstein, and K. Grice.

The Dow Chemical Co., Midland, Mich., at a recent special meeting of the board of directors appointed Willard H. Dow president and general manager to succeed the late Dr. Herbert H. Dow. For eight years Mr. Dow has been a member of the board, serving also for the past four years as assistant general manager and for three as assistant treasurer. The new president is a graduate of the University of Michigan, having received a B.S. in chemical engineering in 1919. He has had eleven years of practical chemical experience.

District Sales Managers of United States Rubber Co. at Recent Detroit Convention

EASTERN AND SOUTHERN

The Monroe Sanders Corp., manufacturer of lacquers, enamels, and varnishes, announces its new address as 39-25 21st St., (550 Van Alst Ave.), Long Island City, N. Y.

A. Schrader's Son, Inc., Brooklyn, N. Y., now offers its new Cair-Free valve core, designed especially for trucks and busses with heavy pneumatic tires. Because of its greater dependability this valve core is being used as standard equipment on many passenger cars. Besides its other features the large, free air passages permit faster inflation and deflation.

Pynchon & Co., crude rubber broker, 111 Broadway, New York, N. Y., has appointed J. C. Maxwell, formerly assistant manager of the commodity department, manager of that department, to fill the vacancy created by the resignation of David B. Rush, who now is with Clark, Childs & Co., Rubber Exchange broker, 120 Broadway, New York.

New York Belting & Packing Co., 91 Chambers St., New York, N. Y., has announced the appointment of John A. Wahlgren as general sales manager. He has been associated with the rubber business for the past twelve years and brings to his new position a wide experience in sales activities.

Frank Griffin, former advertising manager with the Seiberling Rubber Co., Akron, O., has joined The Blackman Co., advertising agency, 122 E. 42nd St., New York, N. Y.

Vulcanized Rubber Co., Morrisville, Pa., has announced two changes in personnel. John J. Noble, acting assistant treasurer and assistant secretary, has been formally appointed to those positions and also made a director. He fills the vacancy caused by the death of Abram M. Sawyer, of Trenton, N. J. Mr. Noble has been assigned to the New York office. Harry Kappler, formerly with the Haepner Co., Ashtabula, O., has been made vice president and superintendent of the Vulcanized Rubber Co. factory. The company continues to operate eight hours a day in a five-day week.

Bloomingdale Rubber Co., through President Clark Harrison, has stated that, effective December 1, its executive offices will be moved from 501 Fifth Ave., New York, N. Y., to its factory at Chester, Pa.

Frank Van Cleef, former secretary, director, and member of the executive committee of The B. F. Goodrich Co., Akron, O., has become a general partner in the investment counsel firm of Cox & Jordan, now known as Cox, Van Cleef & Jordan, 40 Wall St., New York, N. Y. J. Willard Jordan, another of the partners, was formerly auditor of the Goodrich company and later general manager of its plant at Kitchener, Ont., Canada.

I. T. Furman, 2004 Vyse Ave., Bronx, N. Y., is a consulting chemical engineer specializing in golf ball manufacture.

Announcement

Regarding L. H. Hoag, Mrs. Hoag, and George S. Schworm

L. H. Hoag, formerly advertising manager, and his wife, Mrs. Hoag, formerly office manager, severed their active association with the INDIA RUBBER WORLD on October 15, 1930. Their long and faithful services are greatly appreciated by the management, which is continuing to retain them on a part-time basis.

As of this date, George S. Schworm, who has been advertising representative of INDIA RUBBER WORLD in the Akron district for the past three years, becomes advertising manager.

EDWARD LYMAN BILL,
Dec. 1, 1930 Publisher.

George S. Schworm

Schworm WORLD Advertising Manager

George S. Schworm, who succeeded L. H. Hoag as advertising manager of INDIA RUBBER WORLD, is well known in the rubber industry. His first position was with the tire division of the Diamond Rubber Co., going from there to the Goodyear experimental department. Later he was transferred to the mechanical goods factory and sales division. For some time he was associated with rubber brokerage, directly representing a New York rubber broker and dealer. His next connection was with the tire sales division of the Mason Rubber Co.'s Cleveland branch until he became merchandise manager of the *Evening Repository*, Canton, O.

Mr. Schworm became connected with INDIA RUBBER WORLD in May, 1928, and after serving several months in New York, became the Ohio representative with offices in Akron. He is affiliated with Lone Star Fraternity of the University of Akron. He served during the World War in the Chemical Warfare Division of the National Army. His home was in Cleveland, O., prior to his transfer East.

Schwenk Safety Device Corp., 70 E 45th St., New York, N. Y., maker of barrel and carboy tilters, announces that Whitehouse, Davis & Co., Inc., 27 Water St., New York, will be exclusive export representative for Schwenk.

Southwark Foundry & Machine Co., who for 94 years was located in the old Southwark section of Philadelphia, Pa., is now settled in a new plant at Eddystone, Pa. The latest type of equipment has been installed, erecting floors enlarged, and shop layout reorganized. Thus Southwark is better able to serve the rubber industry.

The Kalbfleisch Corp., subsidiary of American Cyanamid Co., has purchased assets and business of A. Klipstein & Co., and its subsidiaries, manufacturers and distributers of chemicals. The Klipstein company will continue as a separate corporate entity. August Klipstein and J. L. Schroeder will remain with the firm, the former as vice president, and the latter as vice president and general manager of the new organization, headed by H. L. Derby as president. Both companies will move on January 1, 1931, to 535 Fifth Ave., New York, N. Y., where the American Cyanamid Co. is located.

United States Institute for Textile Research at a recent meeting in New York, N. Y., elected Dr. Samuel W. Stratton president. Other officers include H. R. Fitzgerald, T. T. Clark, Albert F. Bemis, E. A. Clements, W. R. Blum, H. V. R. Scheel, vice presidents; E. N. Hood, treasurer; and Charles H. Clark, permanent secretary. The institute, now a permanent organization for fundamental research, has been functioning since July as a preliminary with twenty-four directors designated for organization work by an equal number of associations.

The Association of National Advertisers at its twenty-first annual meeting, in Washington, D. C., reelected as vice president Phil J. Kelly, advertising manager of The B. F. Goodrich Co.

Royalite—Architectural Rubber

A three-day exhibition of Royalite, a new rubber product for walls, floors, and trim of much architectural interest and importance, was held last month in the Hotel Roosevelt, New York, N. Y. One term used in describing it is "architectural rubber." Up to the present time the use of rubber in architecture has been limited largely to floors, and the colors and the textures that have been available generally have been imitations of wood, marble, or other stone.

This new product has a character of its own. It is not an imitation of any known material. It is rubber. The colors and textures are new and were developed in the laboratories of the company in collaboration with the well-known colorist, Ben Nash. Royalite is sold through the Flooring Division, United States Rubber Co., 1790 Broadway, New York, N. Y.

NEW ENGLAND

The Quabaug Rubber Co., North Brookfield, Mass., has been operating overtime since Labor Day. The company, which manufactures soles, heels, flooring, etc., expects to continue its present schedule throughout the winter.

The Fairfield Rubber Works, Fairfield, Conn., subsidiary of E. I. duPont de Nemours & Co., Inc., recently completed a $75,000 construction program, which included a transformer building, fire protection lines, laboratory, storage buildings, and a new fabrics warehouse. Max Nickowitz is plant manager.

Arlington Rubber Co., 26 Clayton St., Dorchester, Mass., has considerably enlarged its golf ball facilities for next year. Arlington is releasing several new display containers and brands for 1931 and will continue manufacturing its "Big Three," "Whip," and "Demon" brands in the 1.68 size. The company also makes colored golf balls for miniature courses.

The Russell Manufacturing Co., Middletown, Conn., manufacturer of Rusco and Durak brake linings and almost 400 other automotive fabric products, announces the appointment to its sales force of Oscar H. Counts, who represents Rusco products in the Marietta, O., district. Myron E. Benn, who has been with the Russell company for eight years, has been made service manager in charge of the Rusco branch at 559 Whitehall St., Atlanta, Ga. This branch covers all of the southeastern United States from Virginia to and including Florida and Louisiana.

Herman Fahrenholz, factory superintendent of the Alice Mill of the Woonsocket Rubber Co., and an employe of the United States Rubber Co. for more than 25 years, was tendered a substantial purse by the employes at the Alice Mill on September 30, when he completed his duties and was retired on a pension. The presentation was made by Eugene A. Reilly to whom Mr. Fahrenholz responded fervidly. Mr. Fahrenholz came to Woonsocket more than 25 years ago from the Apsley Rubber Co., Hudson, Mass. He had started in the rubber industry at Milltown, N. J., and came to the Millville plant of the Woonsocket company, and remained there a short time, only to be transferred to the Alice Mill, where he was factory superintendent from 1916 until about six months ago when he was given a special assignment. His successor is A. H. Cressy.

Gordon Glazier of Boston, Mass., has been elected president and treasurer of the President Suspender Co., Shirley, Mass., and has taken charge of the business, succeeding Walter E. Piper, former treasurer and general manager, who resigned because of other business interests.

Ernest M. Clark, a chemical engineer at the Hood Rubber Co., Watertown, Mass., mysteriously disappeared from the home of his cousin at Tyringham, Mass., in the Berkshires, early in November. Mr. Clark, whose home is in Newtonville, had been suffering from a nervous breakdown. Although a wide search was conducted, no trace could be found of the missing chemist.

The Kleistone Rubber Co., Warren, R. I., manufacturer of tiling and sponge rubber products, recently inaugurated an advertising campaign in charge of the Harry M. Frost Co., Boston, Mass.

The Firestone Footwear Co., Hudson, Mass., throughout the winter is featuring on the front page of twenty-three newspapers the slogan: "Firestone Footwear Reigns When It Rains."

The Stedman Rubber Flooring Co., South Braintree, Mass., has given its advertising account to H. B. Humphrey Co., Boston, Mass.

National India Rubber Co., Bristol, R. I., through Factory Manager Maurice C. Smith, Jr., announced that the Keds Division, previously on a four-day schedule, beginning December 1 will return to a five-day schedule. Although the daily output will be the same, it is expected that the weekly ticket will increase about 25 per cent by the new schedule.

Peerless Cement Co., Holbrook, Mass., has announced its acquisition of the golf ball plant of the United States Rubber Co., in Stoughton, Mass. As soon as the necessary renovations are completed, the unit will be devoted to the manufacture of rubber cements for all purposes.

Mitchell B. Kaufman, president of the Hodgman Rubber Co., Framingham, and the Converse Rubber Co., Malden, both in Mass., who disappeared in woods of northern Maine last month, is still missing. Hundreds of experienced woodsmen from Canada and Maine have searched without finding any indications that he is dead or alive. The disappearance of Mr. Kaufman is as much a mystery as it was when he failed to return with the guide ten days ago. The heads of the searching party are still hopeful of finding him.

The Fitchburg Rubber Co., Fitchburg, Mass., under a bankruptcy sale went to the Goodrich Rubber Co. last month. It was announced that the Fitchburg company would continue under its present name and retain most of the present personnel.

FINANCIAL

Raybestos-Manhattan, Inc.

The earnings of Raybestos-Manhattan, Inc., during the nine months ended September 30, 1930, were $1,359,837.54, or $2.01 per share on the 676,012 shares of common stock outstanding, before providing $407,861.20 for depreciation of fixed properties, but, after making all other charges against current income for federal and state taxes, adjustment of inventories, etc.

No part of the company's reserve for contingencies of which $425,000.00 was set up specifically to provide for inventory adjustments was utilized during the period. If the entire reserve had been utilized, the earnings, before the charges of $407,861.20 for depreciation mentioned above, would have been $2.64 per share.

The sales and earnings were as follows, as compared with the year preceding:

Sales and Earnings	Quarter Ended Sept. 30, 1930	Nine Months Ended Sept. 30, 1930	Nine Months Ended Sept. 30, 1929
Net sales	$3,935,311.56	$13,506,762.76	$18,812,492.21
Net income after taxes and inventory adjustments	260,983.56	1,359,837.54	3,564,753.89
Per share	.39	2.01	5.27
Depreciation	134,506.33	407,861.20	455,834.08
Net earnings available for dividends	126,477.23	951,976.34	3,108,919.81
Per share	.19	1.41	4.60

The company's total assets were $18,994,074.58, against which there were no bank loans, funded debt, or other capital obligations, other than the common stock.

The current assets, including cash, bonds, and other marketable securities aggregating $3,737,257.16, were $9,445,854.81, or approximately 11¼ times the current liabilities of $804,533.70. The company had in cash and readily marketable securities, representing the investment of surplus cash, enough to meet its dividend requirements for two years. The book value of the company's stock was $25.90 per share without including the reserve for contingencies already referred to. Of this value $13.97 per share was represented by current assets.

The directors declared also the quarterly dividend of 65c per share payable December 15, 1930 to stockholders of record at the close of business November 29, 1930.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Com.	$1.00 q.	Nov. 15	Oct. 31
Boston Woven Hose & Rubber Co.	Pfd.	$3.00 s.a.	Dec. 15	Dec. 1
Boston Woven Hose & Rubber Co.	Com.	$1.50 q.	Dec. 15	Dec. 1
Firestone Tire & Rubber Co.	6% Cum. Pfd.	$1.50 q.	Dec. 1	Nov. 15
B. F. Goodrich Co.	7% Pfd.	$1.75 q.	Jan. 2	Dec. 10
I. B. Kleinert Rubber Co.	Com.	$0.25 q.	Dec. 1	Nov. 25
Raybestos-Manhattan, Inc.	Com.	$0.65 q.	Dec. 15	Nov. 29

NEW JERSEY

Little change took place during the past month in the rubber industry in New Jersey. The production of certain mechanical goods remains good, yet in other types it dropped off a little. But this decrease was expected at this season of the year. Tire production is normal, with no change in prices. Hard rubber manufacture has increased; while orders for heels and soles show no decrease. Factories making brake lining report business good.

The Thermoid Company has acquired an option on the Woven Steel Hose & Rubber Co., both of Trenton, and expects soon to complete the purchase. The Thermoid board of directors recently convened to discuss the matter and voted it desirable. Notice of the decision was sent to the Thermoid stockholders. Joseph O. Baur, Thermoid secretary-treasurer, declared that the proposed purchase has met with strong favor and that his concern would take on additional help at the Woven Steel Hose plant for production would be increased after the sale. Terms will be on a basis of cash and stock, by which Woven Steel Hose stockholders will acquire an interest in The Thermoid Company. The Woven Steel Hose & Rubber Co. manufactures molded garden and air hose and has been operating at a fair rate of production. Officers of the company include Horace B. Tobin, president and treasurer; Ralph W. Tobin, vice president; and Henry B. Skellenger, secretary. The Thermoid Company reports no decrease in business during the past summer and fall; consequently the plant continues to operate normally. J. A. Wheatley, general sales manager, and F. Robert Lee, vice president, attended the Jobbers' Convention in Detroit, Mich.

The Thiokol Corp., Kansas City, Mo., has leased the plant of the Zee Zee Rubber Co., Yardville, to manufacture Thiokol, a rubber substitute. Dr. J. C. Patrick, is vice president and director of research and Bevis Longstreth, of Kansas City, is president and general manager. The company will close its plant in Kansas City, and the employes will move to Yardville with their families. Fred R. Sayen, treasurer of the Mercer Rubber Co., Trenton, assisted the Trenton Chamber of Commerce in securing the new industry for Trenton.

Puritan Rubber Co., Trenton, is experiencing good business and expects the plant to be running normally for some time.

Pocono Rubber Cloth Co., Trenton, reports that business has continued good all summer and prospects are encouraging for the coming months.

John S. Broughton, former president of the United & Globe Rubber Corp. and the Globe Rubber Tire Co., is interested in a proposal to build a big bus terminal for all the lines entering and leaving Trenton. Mr. Broughton was affiliated with the rubber industry for many years.

Receivership for Murray Rubber

Alfred A. Branham, vice president and general manager of the Murray Rubber Co., Trenton, manufacturer of tires and tubes, has been appointed equity receiver for the company by Federal Judge William N. Runyon. The receiver was named on application of Miller, Franklin & Co., Inc., New York, N. Y., who claim $15,673 for services as industrial engineers. The petition stated that, although the Trenton concern is solvent, it has liabilities of $2,495,000 of which $845,000 is due and cannot be paid for lack of ready cash.

The company was organized in 1922 with 10,000 shares of capital stock and 100,000 shares of common stock. It was reorganized about six months ago after receivership proceedings, and consented to the present action.

H. B. Slusser, vice president and treasurer of the Pocono Rubber Cloth Co., and **Clifford H. Oakley,** president of the Essex Rubber Co., Trenton, are active workers for the Boy Scouts recreation center of Trenton. The rubber executives are members of the campaign fund which succeeded in raising $15,000 to pay off the mortgage of the $60,000 recreation center.

Pierce-Roberts Rubber Co., Trenton, announces that business is satisfactory in the molded goods department, but it is somewhat slack in other departments.

Crescent Insulated Wire & Cable Co., Trenton, recently gave its semi-annual banquet to 250 employes at Hillwood Inn, near Trenton. Edmund L. Robinson, factory manager, was toastmaster. The company reports greatly increased business due to a pick-up of the trade in radio supplies. The concern has hired about 400 new workers during the past few weeks; and about 75 per cent are girls and young women. General C. Edward Murray, president of the Crescent company, was appointed by Mayor Frederick W. Donnelly a member of the Citizens' Committee on Unemployment.

Clarence D. Wilson, secretary-treasurer of the Luzerne Rubber Co., Trenton, has been on a business trip through New England.

John S. Quimby, of Pennington, well-known in the rubber industry, has been appointed business manager of the State Teachers' College, Trenton, to succeed John S. Neary, who resigned. Mr. Quimby was for nearly a quarter of a century purchasing agent of the Jos. Stokes Rubber Co., Trenton, and for the past few years has been a salesman for the Vulcanized Rubber Co., Morrisville, Pa. He has always been affiliated with the hard rubber industry.

Essex Rubber Co., Trenton, states that business continues fairly good. The company has maintained the same number of employes for the past several years, and the business depression has not resulted in any decrease in help.

The Carrier Engineering Corp., Newark, widely known in the rubber and allied industries through its air conditioning and drying installations, will merge with the Brunswick-Kroeschell Co., New Brunswick and Chicago, Ill., maker of refrigeration systems, and the York Heating & Ventilating Corp., Bridgeport, Pa. Including subsidiary and affiliated companies, the merger will unite fifteen concerns, five of them foreign, with total assets of approximately $15,000,000. All of the companies involved will retain separate entities under a holding company to be known as the Carrier Corporation.

Thomas H. Thropp, former president of the Trent Tire Co., Trenton, has been seriously ill with a nervous breakdown, at his home, 800 W. State St.

A. H. Branham, vice president and general manager of the Murray Rubber Co., Trenton, has been on a business trip through the South.

Jos. Stokes Rubber Co., Trenton, is operating normally and expects the hard rubber business to pick up during the early winter. Milton H. Martindell, secretary of the company, went to Cleveland, O., on a business trip last month.

October Consumption

Consumption of crude rubber by manufacturers in the United States for October amounted to 27,271 long tons, an increase over September of 8 per cent. In previous years there has been virtually no change in the consumption for October as compared with September.

Imports of crude rubber amounted to 43,729 long tons as compared with 39,467 long tons for September and 43,725 long tons for October a year ago.

Stocks on hand continue to increase and at the end of October were placed at 184,701 long tons, an increase of 9 per cent over September 30, and compares with 88,483 long tons a year ago.

Crude rubber afloat for United States ports on October 31 amounted to 51,122 long tons.

Tire Production Statistics

Inventories of pneumatic casings on hand continue their downward trend according to statistics issued by the R. M. A. There were 9,811,764 casings on hand September 30, a decrease of 10.6 per cent under August 31 figure of 10,847,705 casings.

Production of pneumatic casings for September is placed at 3,365,444, a decrease of 24 per cent under the August figure of 4,165,611. Production for September a year ago amounted to 4,460,250 casings.

Shipments of pneumatic casings for the first nine months of this year exceeded production by 4.8 per cent as compared with a 1 per cent excess of shipments over production during the same period of 1929. Shipments of pneumatic casings for September amounted to 4,405,176 as compared with 5,174,875 casings in August, 1930, and 5,623,465 a year ago.

PACIFIC COAST

While experiencing the usual seasonal slowing down of sales at this time of year, rubber manufacturers and distributers on the Pacific Coast are quite unanimous in regarding conditions as both sound and encouraging. Prices on a wide range of mechanicals, clothing, and footwear, druggists' sundries, and various specialties are holding up very well, and dealers' stocks, it is said, were never lower. The tire market, however, gives many dealers much anxiety. Buyers have been holding off about as long as possible, and conditions favor a brisk replacement trade in the near future and at good prices; but the fly in the ointment continues to be irregularity in merchandising due to keen competition.

Complaint continues to be made by large and small dealers that it is hard to get supplies at prices and on terms that are fair and uniform for all buyers. Apparently the tire-price war has abated, but there are still sections where the dove of peace has not yet found a resting place. Recently when the war was at its height, it is stated, inducements to dealers extended all the way from three times 10 per cent discount to seven 10s and 5 extra for cash. One large corporation is said to have on the latter basis bought several times its normal requirement of tires and to have made considerable profit by disposing of most of its surplus to dealers on a five-10 basis, or at less than even large dealers could have bought the tires directly. That there has been much speculation in this way is generally known in the trade. The big buyers figure that rubber will gradually get dearer and that tire prices may be advanced in the near future.

Tire makers are defended on the ground that they had a perfect right to dispose of their products at such prices and on such terms as suited the interests of their companies, especially when by so doing they have been making a profit, been giving additional employment, holding working forces together, and getting rid of considerable manufactured stock as well as reducing large inventories of crude rubber that would probably have to be written down anyhow for a very large sum by the end of the year. With much of the funds thus quickly realized, it is said, some have been acquiring a great deal of new rubber at the prevailing low price range and putting themselves in a position to average a better profit later on finished goods. Denial is made that extravagantly lenient terms for payments have been allowed to some buyers in order to induce the latter to quit dealing in rival products.

Goodyear Tire & Rubber Co., Los Angeles, Calif., instead of venturing on a chain-store scheme or a string of company-owned super-service stations through which to market tires, has decided to try a different plan. It has arranged with Van Fleet-Durkee, Inc., which operates 525 stations on the Pacific Coast selling Shell Oil Co. products exclusively, for selling also Goodyear tires and tubes on a 10 per cent basis, all supplies to be obtained from local Goodyear dealers, instead of directly from the factory. It is conceded that the deal is somewhat of an experiment, but the interested parties feel quite confident that it will prove quite satisfactory. The Los Angeles factory is operating quite close to capacity and the management expects production to be speeded up considerably within the next month.

Firestone Tire & Rubber Co. of California, Los Angeles, Calif., after having had its factory as well as that of the Xylos Rubber Co. on its grounds closed down for a week for inventory taking, reopened early in November and has since been going strong on accumulated orders and in making preparations for a considerable expansion in production. Vice President and General Manager R. J. Cope, Vice President and Sales Manager R. C. Tucker, H. D. Tompkins, manager of truck and bus tire sales, and the six managers of the coast branches have been attending a mid-November conference at Akron, O., with some fifty branch managers from other parts of the country, at which an aggressive selling campaign for 1931 was planned, which, it is expected, will put the Firestone sales well above 20 per cent of the national total. A recent visitor at the Los Angeles plant was Samuel Broers, of Akron, vice president of the Firestone Export Co., who brought with him by airplane Carl B. Schmidt, of Mexico City, president of the Mexican Trading Corp., Firestone distributers in the southern republic. Mr. Schmidt and his staff have a selling territory of 2,000,000 kilometers, and they fly an average of almost 10,000 miles a month.

Samson Tire & Rubber Corp., Los Angeles, Calif., which is merging its tire business on the Pacific Coast with the United States Rubber Co., has found that its stockholders are very enthusiastic about the deal, and the officers are fairly working night and day arranging for the required transfer of shareholdings. The time limit is set for December 31 in which the stock of the old company may be exchanged on the more advantageous terms for that of the new corporation, which will conduct the business as a subsidiary of the United States Co., and which has been organized with a Delaware charter. The U. S. company will buy 120,000 shares of the A common stock carrying voting rights and 50,000 shares of the B common of the new corporation for $600,000, provided the holders of not less than 85 per cent of the outstanding Samson common stock shall have exchanged or deposited for exchange their shares on or before December 31. Exchange before that date may be made on the basis of one share of Samson common for one share of preferred stock plus 3-10 share of B common in the new corporation. After that date exchange may be made on the basis of one share of Samson common for one share of the new preferred without the additional B common. The preferred carries a 5 per cent dividend guaranteed for five years. The deal also provides for the liquidation of some $600,000 bank obligations, for the working out of a profit-sharing plan for Sampson company employes, and for the continued manufacture and sale of Samson-brand tires.

Diamond tire sales in the Far West are keeping well above the average, according to K. K. Kantzer, Diamond sales manager for the Pacific Coast, who was a recent guest of Howard F. Smith, Diamond distributer for San Francisco, Calif. Mr. Kantzer recently appointed Roy K. Schultz as distributer for the northern part of California. It is stated that the Diamond policy for 1931 will be elimination of branch expense and dealings directly with exclusive dealers on a mill door cost basis.

Kelly-Springfield Tire Co. is getting its share of business on the Pacific Coast, according to J. R. Bennyhoff, branch manager in San Francisco, with headquarters at 560 Ninth St. Overseeing this coast business is conducted by George R. Martin, of the main office in New York, N. Y., who makes quarterly trips covering the entire Pacific Coast field. J. P. Cahoon, branch manager at Los Angeles, Calif., returned last week from a trip to New York.

Seiberling Tire & Rubber Co. has recently been making a study of coast trade conditions through Vice President H. L. Post, of Akron, O., who is in charge of sales. He was accompanied on his visits to the larger cities by Pacific Coast Manager C. B. Reynolds, whose headquarters are at 475 Hoyt St., Portland, Ore.

Pacific Goodrich Rubber Co., according to Vice President and General Manager S. B. Robertson, planned to begin on December 1 the production at its factory in Los Angeles, Calif., of the new Goodrich puncture-sealing inner tube, developed at Akron, for which special equipment has recently been installed at the California factory under the direction of Plant Superintendent Fred A. Nied. General Sales Manager F. E. Titus reports a very satisfactory response to his appeal to some 10,000 distributers, dealers, and employes in the eleven Pacific coast states to "buy something" in order to help industry to revive and provide more employment. Mr. Titus recently returned from a conference with the officials of the parent Goodrich company at Akron. He found that the coast division had led all others in the country in sales for 1930 and states that production at the Los Angeles plant will soon be much increased. R. Jud. Loomis, branch manager at Denver since February, 1929, has been appointed San Francisco branch manager and also put in control of the Goodrich Silvertown, Inc., stations in the Golden Gate district. Prior to being in Denver, Mr. Loomis had been Goodrich Oakland manager for many years.

Willard Battery Co. of Los Angeles, Calif., subsidiary of the parent Willard

concern in Cleveland, O., has been operating its new factory adjoining the Goodrich plant nearly to capacity for several weeks. A gratifying increase is especially noted in the company's trade with Australia and New Zealand, as well as in the coastal territory.

Goodyear Rubber Co., distributer of mechanicals, footwear, clothing, and asbestos products, 61-67 Fourth St., Portland, Ore., according to President L. C. Garrigus, Jr., is enjoying a good share of trade in the Northwest and feels quite optimistic about the near future. Howard Middleton of the Goodyear (manufacturing) concern in San Francisco is vice president, E. J. Morton is treasurer, and C. E. Mace, secretary.

Falls Rubber Co., Akron, O., has recently been surveying business conditions on the western coast through President W. P. Cline, who was accompanied on this trip by R. P. Bremer, chairman of the board of directors. They report very bright prospects.

The Darnall Corp., 3517 E. 11th St., Long Beach, Calif., which has long been engaged in making rubberized casters of various types for trucks, furniture, etc., announces that it has relinquished its old name of Perfect Caster Co., and that it is now operating its own rubber shop, having found it more convenient to make all its tires on the premises instead of having them produced in the East. The making of such solid bands is done under the direction of Harold G. Cogswell, an expert in his line, who formerly conducted the Paragon Rubber Products Co., Los Angeles, Calif. The officers of the Darnall Corp. are president, W. R. Darnall; vice president, W. R. Darnall, Jr.; Secretary, A. G. McGrath; treasurer, Mrs. W. R. Darnall. Products are distributed on a nation-wide scale.

Utility Mfg. Co., Cudahy, Wis., has as its Los Angeles representative Lombard Smith Co., 324 N. San Pedro St.

Obituary

Retired Rubber Executive

SAD news comes to friends and former business associates of George Schlosser. For the beloved veteran died at his home, 530 S. Main St., Woonsocket, R. I., on November 8, following a heart attack from which he had suffered ten days previously, but had failed to rally.

Mr. Schlosser began his association with the rubber industry, in which for many years he had been a leading figure, in 1882, when he joined the New Jersey Rubber Shoe Co., New Brunswick, N. J., as office boy. His ability won him many promotions, culminating in his appointment as assistant superintendent.

In 1895, however, realizing the greater opportunities with the National India Rubber Co., he left the New Brunswick concern to become factory manager of the Bristol, R. I., plant. He remained there until 1901. Then he went to manage the Woonsocket Rubber Co. mills and held that position until 1922. He directed too the Alice Mill in Woonsocket and the Millville, Mass., plant, both units of the United States Rubber Co. From 1911 until 1916 he was also manager of the L. Candee Rubber Co. and the U. S. Rubber plant, both in New Haven, Conn. He relinquished these additional duties in 1916 when he assumed the factory management of the National India Rubber Co. unit in Bristol. Mr. Schlosser became general manager of all footwear and miscellaneous plants of the U. S. Rubber Co. in 1922, retaining that post until his retirement in 1928.

For thirty years he was one of Woonsocket's leading citizens. He served as a vestryman at St. James Episcopal Church, an ex-president of the Woonsocket Y. M. C. A., and a director of the local Building & Loan Association. He was also a 32nd degree Mason and a member of Palestine Temple A. A. O. N. M. S.

The deceased was born in Milltown, N. J., on April 7, 1865. His formal education was received in the elementary schools, the New Brunswick High School, and the New Jersey Business College, Newark.

Mr. Schlosser leaves his widow; a son Harry, factory manager of the American Wringer Co., Woonsocket; a sister; a

George Schlosser

nephew; and a niece. To all of them is extended deepest sympathy in their hour of bereavement.

Francis G. Shoemaker

WHILE on a business trip in Springfield, Ill., Francis G. Shoemaker, 28, traveling auditor of the General Tire & Rubber Co., Akron, O., died on November 15. His body was returned to Akron for burial in Rose Hill Cemetery.

He was a former student of Ohio State University and of Akron Law School. Since leaving college he had been with the General company.

Surviving him are his widow, their daughter, his parents, and a sister.

Well-Known Rubber Man

JOHN J. CONNLY, director and secretary of the Rhode Island Web Co. and an organizer of the Standard Machinery Co., Auburn, R. I., and for many years an associate with the late Joseph Bannigan, died October 1, aged 67 years, at his home, 48 Cottage St., Pawtucket, R. I. He had been in ill health for a year and a half, but was thought to have been recovering when he suffered a relapse.

Born in Rochdale, England, August 4, 1863, he came to this country with his parents, the late Patrick and Anna (O'Connor) Connly, and settled in Lonsdale, R. I. After graduating from La Salle Academy, Providence, in 1884, he became associated with Mr. Bannigan and remained with him until the latter's death. In 1903 with two other men he organized the Standard Machinery Co. of which he was treasurer until his death.

He was also a director of the Mosler Safe Co., Hamilton, O.; the Standard Mohair Plush Co., Hyde Park, Mass.; the New System Service Textile Co., Pawtucket; and the Rhode Island Web Co., Pawtucket. He is survived by his widow, five sons, and three daughters.

Coleman duPont

LAST month at his home in Wilmington, Del., General T. Coleman duPont, former senator from Delaware and a former president of E. I. duPont deNemours & Co., died following an illness of two years, which had caused him to resign as senator in December, 1928. He was a cousin of Pierre S., Lammot, Irenee, and Alfred I. duPont, members of the family now directing the E. I. duPont enterprises. While a senator, General duPont was extremely active in advocating modern highway building. He was also one of the founders of the National Highway Association.

Veteran Rubber Man

AT HIS home on October 28 died Eugene B. Respess, foreman of the Hartford Rubber Works, Hartford, Conn., before it moved to Detroit, Mich., a year ago. Mr. Respess had been employed for a quarter of a century by this branch of the United States Rubber Co. and was retired with a pension when the plant closed.

He was born in Upson Co., Ga., February 1, 1868. Surviving him are his widow, a son, a daughter, and five sisters.

Funeral services were conducted on October 31. Burial was in Ellington Cemetery.

Albert O. Forbes

ALBERT O. FORBES, for many years with the Boston Rubber Shoe Co., died at his home in Malden, Mass., on October 23. Mr. Forbes is survived by his widow, a daughter, and three sons.

CANADA

Garden hose manufacturers state that business placed for 1931 is of good volume. In some sections of Ontario, particularly in the north, a good carry-over stock is reported, because of plentiful rains during the summer; but business appears average in other districts. No change was made in prices for booking, and similar terms to 1929 are effective.

Weatherstrip continues active, but with the advent of colder weather heavier sales are expected. Consequently the market is expected to continue active for some time. Wholesale prices are steady.

Wholesalers are now experiencing a good demand for friction tape used in taping hockey sticks. Friction tape is supplied in one, two, four, and eight ounce packages. Hockey pucks also are in heavy demand and, as the season advances, will be still more so.

Automobile tire manufacturers intimate that their salesmen now seek 1931 orders. As tire prices are without recent change, bookings are taken at present prices and under the same terms as last fall.

Travelers are still working on fall orders for rubber footwear. But business is not so heavy as it was when early orders were necessary for a cash discount. Now the discount applies whenever goods are bought. This cash discount may at any time be withdrawn, yet the trade feels manufacturers are not likely to do so without notice. Doubt that buyers have about the future also seems to be holding back orders. In the Maritime Provinces, where the outlook is relatively good, the disposition is to be very cautious in buying at present.

It was reported early in the fall that rubber companies were likely to adopt new discounts off list prices on mechanical rubber goods and to do away with the practice of taking off 2 per cent from the face of invoices for the last two reductions in sales tax, but so far no action has been taken. Rumors are to the effect that reductions in the price of mechanical rubber goods might soon be made. For the present the usual discounts are in effect.

Goodyear Tire & Rubber Co. of Can., Ltd. What is claimed the largest belt ever made in Canada is now being manufactured in the Goodyear Bowmanville, Ont., plant. The belt is being made in six parts, each of which will weigh about three and a half tons, and will take about two weeks to manufacture. When completed, it will be well over a mile in length and will weigh some 20½ tons. It will go to a South American mining firm to be used as a conveyer belt in a mine.

Pearl Y. Smiley has returned to Canada from Akron, O., U. S. A., as development manager of the Footwear Division, Canadian Goodrich Co., Ltd., Kitchener, Ont. With the transfer of the Akron footwear division to Watertown, Mass., U. S. A., in consolidation with the Hood Rubber Co., a plan was made for Mr. Smiley's return to the Canadian plant. Mr. Smiley is well known among rubber men in the United States and Canada. His thirty years' experience makes him a valuable addition to the Canadian company.

Canadian Industries, Ltd., Montreal, P. Q., (Fabrikoid Division), reports one of its most attractive and widely used products, C. I. L. Fairfield Fabrics, has found a wide market as a raincoat and sportswear material. It is absolutely waterproof and has become a leader among rubberized fabrics for outdoors.

Viceroy Mfg. Co., Ltd., Toronto, Ont., announced a change in control of Canadian I. T. S. Rubber Co., Ltd., from the United States to Canada, with the offering of $300,000 6½ per cent first mortgage bonds of the Viceroy Company, which was incorporated recently to take over property and assets of the former company. The proceeds of the bond sale will be used to liquidate existing indebtedness, to provide working capital, and to redeem a block of preferred stock. H. S. Jeffries, general manager of the old company, is president and general manager of the new organization.

Ernest I. Kilcup, of the Davol Rubber Co., Providence, R. I., U. S. A., presided at a recent district conference of members of the National Association of Credit Men, from New York, New Jersey, and eastern Pennsylvania, held for two days at the Mount Royal Hotel, Montreal, P. Q. Mr. Kilcup is a director of the National Association.

Stedfast Rubber Co., Mattapan, Mass., U. S. A., will open a plant in Granby, P. Q., to be in production by the end of December, 1931. The company manufactures rubberized products chiefly for the boot and shoe industry.

National Shoe Retailers' Association has selected January 12 and 13 as the 1931 convention dates for a style revue at the Royal York Hotel, Toronto, Ont., and will emphasize particularly Made-in-Canada footwear. This revue will be confined strictly to Canadian firms to show samples to the retail trade.

Granby Elastic Web Co., Ltd., Granby, P. Q. Members of the Montreal chapter of the Canadian Society of Cost Accountants and Industrial Engineers recently visited the Granby factory, where they were shown how elastic bands are made. Later a reception was given the members by P. E. Boivin, mayor of Granby and president of the company, and P. H. Boivin, secretary-treasurer. At night the guests were entertained at the Granby Hotel and were welcomed by a committee including W. H. Miner, vice president of the Canadian Manufacturers' Association and president of the Miner Co., Ltd.; R. Macaulay, secretary-treasurer; and N. Austin, factory manager.

Dunlop Tire & Rubber Goods Co., Ltd. The Montreal and the Ottawa divisions recently held their annual sales convention at the Windsor Hotel, Montreal, when E. C. Martin, general sales manager, presided. He stated that the factory is "tuned up" to standards that rank with the best known practice, and the sales organization is providing ample evidence of well-directed and successful activity. H. H. Lewis, Western Canada manager of the Dunlop Company, presided at a recent conference in Vancouver, of the firm's sales organization in British Columbia. He said that production and sales have been well maintained throughout the summer and the fall of this year. E. G. Skirrow, Dunlop advertising manager, also attended the Vancouver convention.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., operates its plant three 8-hour shifts daily to satisfy the demand for Seiberling hot water bottles and other druggists' sundries.

George Bergeron has resigned as general sales manager of the Dominion Rubber Co., Ltd., Montreal, P. Q., after eighteen years to accept the position as general sales manager in charge of sales for all thirty-five branches in the provinces of Quebec and Eastern Ontario of Legare Automobile & Supply Co., Ltd., Montreal.

Gutta Percha & Rubber, Ltd., Toronto, Ont., announces that lower new prices have been established on its Muranese and Sunlight mats.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
‡48,171	Surgical gloves	Berlin, Germany
*†48,180	Vulcanizing patch outfit	Belgrade, Yugoslavia
‡48,190	Bathing and sport novelties	London, England
†48,198	Tires and tubes	Villa Franca de Xira, Portugal
†48,229	Toy balloons and belts	Cairo, Egypt
†48,230	Druggists' sundries	Bucaramanga, Colombia
†48,261	Tires	Port au Prince, Haiti
†48,262	Friction tape and tire repair outfits	Wellington, New Zealand
†48,301	Casings and inner tubes	Danzig, Germany
†48,337	Toy balloons	Prague, Czechoslovakia
*48,338	Combs	Hamburg, Germany
†48,387	Aprons, hot water bottles, galoshes, etc.	Chemnitz, Germany
*†48,401	Casings and inner tubes	Nyrany, Czechoslovakia
*48,402	Tape	Copenhagen, Denmark
†48,465	Infants' goods	Milan, Italy
†48,466	Druggists' sundries	Lima, Peru
†48,467	Sport goods and novelties	Neulengbach, Austria
†48,468	Hose and mats	Lima, Peru
†48,471	Toys	Rome, Italy
†48,500	Tires	Vienna, Austria
†48,508	Insulating tapes	Sydney, Australia
†48,519	Mechanical goods	Habana, Cuba
†48,523	Bathing caps, toys, and other goods	St. Ouen, France
†48,553	Tread	St. Etienne, France
*†48,608	Hose	Belgrade, Yugoslavia
†48,617	Gym shoes, heels, and soles	Cologne, Germany
*48,633	Hose, sheets, and packings	Rotterdam, Netherlands
‡48,634	Tires, inner tubes, belting, hose, soles, and heels	Lisbon, Portugal

*Purchase. †Agency. *†Purchase and agency. ‡Either.

The Rubber Industry in Europe

GREAT BRITAIN

Institution of Rubber Industry

The first annual dinner of the West of England Section of the Institution of the Rubber Industry will take place on December 10 at Trowbridge. Sir Herbert Blain will preside.

The Midland Section of the Institution held its first meeting this season, October 14 in Birmingham when B. D. Porritt delivered a lecture on "The Early Days of the Rubber Industry." D. F. Twiss presided, and James Lyne Hancock, Ltd., arranged for an exhibition of the original Hancock plant.

At the meeting of the London and District Section of the I. R. I., held on November 3, C. W. Shacklock read a short paper on the "Surface Tension of Rubber Solution," while F. H. Cotton read one on "Reenforcement," taking the place of G. G. Cole who, owing to illness, was unable to attend and read his paper on "The Attachment of Hard and Soft Rubber to Metal," as had been arranged.

Rubber Roadways Paving Scheme

At a meeting of the Rubber Growers' Association suggestions concerning the commercial development of rubber roadways as submitted by the board of Rubber Roadways, Ltd., were considered. The main points were that the cost of rubber paving had been reduced from £5 to under £3 per square yard; that in view of the advantages of rubber for paving, the placing of such a material on the market at a competitive price would undoubtedly create a permanent new industry capable of absorbing large quantities of crude rubber annually; that the importance of paving to rubber growers was indicated by the fact that over 200 tons of rubber would be used for a mile of rubber roadway the width of New Bridge St.; that the commercial development of rubber roadways would be greatly stimulated by further technical research, by subsidies of crude rubber and by financial assistance.

The Council of the Rubber Growers' Association, agreeing with the view that the time had arrived for some bold and concerted action to be taken to encourage the commercial development of rubber roadways, decided to appeal to producers to agree to supply Rubber Roadways, Ltd., standard quality of rubber for a period of five years on the following basis:

In each of the five years an amount not exceeding the equivalent of (1) One-half of one per cent of their 1929 crops free; (2) One per cent of their 1929 crops at market price ruling on date of delivery or 6d. per pound, whichever is lower; (3) One per cent of their 1929 crops at market price ruling on date of delivery or 9d. per pound, whichever is lower.

It is proposed that the rubber will be called for in the above order as and when required; and it will be devoted to the manufacture of or experiments connected with rubber roadways and to cognate purposes; and will not be realized for the purpose of providing funds. Assents to the scheme will not be binding unless producers representing a production during 1929 aggregating not less than 150,000 tons agree to provide rubber on the basis outlined. The appeal is addressed to all producers domiciled in the United Kingdom, also to local companies and proprietors and large Asiatic proprietors. Dutch and other European producers are being approached through the International Association for Rubber and Other Cultivations in the Netherlands Indies, The Hague.

In view of the crisis in the rubber plantation industry the Council feels that rubber producers will appreciate the desirability of exerting every effort to make rubber roadways a commercial proposition, and they express confidence that their appeal will receive wholehearted support.

Dutch Opinion

The correspondent of the *Financial Times* learns that the Dutch are much interested in the Rubber Growers' Association scheme regarding roadways, and it is believed that the response to the appeal will be good on the part of the Dutch rubber growers. It is considered a sound attempt to improve the situation from the consumption side.

At the same time it is felt that the scheme is only a partial solution of the present crisis, since the cost of the rubber forms but a relatively small portion of the total cost of production of rubber road blocks.

Olympia Automobile Show

The twenty-fourth automobile show was held under the auspices of the Society of Motor Manufacturers & Traders, Ltd., during the latter half of October. For the manufacturer of rubber the tire section has the greatest interest. This year the number of exhibitors declined to only 15 stands in the tire section. All, with a single exception, were British firms or British branches of foreign manufacturers. Among the firms represented were the following: Avon India Rubber Co. showed the new range of Avon-Seiberling tires with the buttressed tread, besides Avon four-ply automobile casings. British Goodrich Rubber Co., Ltd., showing a gilt edge on its reenforced tires, exhibited accessories for motor boats including "Cutless" bearings. J. W. & T. Connolly, Ltd., displayed reenforced tires, cushion rubber fenders, rubber floor cloths ⅛-inch thick in plain colors and mottled or marbled effects, piping for keeping out draughts, etc. Davies Tyre Co. featured Davies cord balloon tires, cured by the "water-bag" process. A London user states that his set was still in use after having covered over 48,000 miles.

Dunlop Rubber Co., Ltd., showed the new Dunlop-Goodyear Magna wire wheel with one-piece patent center type hub. Firestone Tire & Rubber Co., Ltd., had on view the new heavy duty balloon tire with the distinguishing gold strip. Henley's Tire & Rubber Co., Ltd., has adopted a green line on its cord tires, which have buttressed treads and are said to give an increased mileage amounting to 20 per cent.

Hermetic Rubber Co., Ltd., had a large variety of accessories for the automobile and allied trade employing rubber, including: molded to shape and cured rubber and canvas hose joints for radiators, compo-rubber reenforced piping for repairing broken fuel pipes of large vehicles, one-piece slip-over sheaths for steering gear and similar exposed couplings, etc.

David Moseley & Sons, Ltd., exhibited an interesting collection of mattresses, ground sheets, sleeping bags, and other camping equipment, an improved safety waistcoat for use on speedboats, etc. It was noted that the Austin Co. is standardizing Moseley Float-on-Air cushions for front and back seats for some of their 1931 cars.

Rudge-Whitworth, Ltd., showed its one-piece hub wheel, in which the bolts are completely enclosed by a large pressed hub shell. A large disk, easily removable by means of a knife-edged tool, covers the shell.

Sorbo Rubber Sponge Products, Ltd., now produces sponge rubber gaskets and piping for excluding draughts, and also fluted hand-molded matting for vehicles.

In the garage equipment section a very complete collection of appliances for testing brakes, tire and wheel alinement testing gages, tire vulcanizing apparatus, power-type inflaters for tires, etc., was seen.

India Tire Co.

A group of distributing companies of the India Tire & Rubber Co. (Great Britain), which is to operate in various parts of England, has been registered. These companies number eighteen in all, seven of which have a capital of £500, three of £1,000, three of £2,500, two of £1,500, one each of £800, £1,200, and £10,000. In each case the capital is divided into 1s. shares; while the companies are designated India Super Tyres, Ltd., and in parentheses the particular county or division in which they are located.

GERMANY

Rubber Statistics

The condition of the German rubber industry is reflected in statistics for imports and exports of crude and manufactured rubber, published for the first nine months of the current year. Crude imports totaled 399,148 quintals, value 58,161,000 marks, against 421,207 quintals, value 81,875,000 marks, for the same period of 1929.

Imports of manufactured goods also continued to decline. The 1930 figures are 56,701 quintals, value 27,848,000 marks, instead of 62,809 quintals, value 30,484,000 marks. • The amount of manufactured goods exported was practically stationary, but a marked fall is shown in value: January-September, 1930, 165,133 quintals, value 86,900,000 marks, and January-September, 1929, 165,245 quintals, value 96,-168,000 marks. In September, 1930, exports were 16,190 quintals against 19,105 quintals in September, 1929.

Tire Prices

It will be remembered that German tire manufacturers had announced a 5 per cent cut in tire prices for private cars and 10 per cent for truck tires, effective October 1, 1930. Now, however, according to a change on October 14 prices of passenger car tires have also been reduced 10 per cent. But even further reductions are expected because the question has again been discussed for consumers find the recent decrease inadequate. In well-informed circles rumors cover the possibility of an additional 10 per cent cut in the gross price of tires, from January 1, 1931. At the same time tire manufacturers are reported negotiating with dealers' associations regarding lowering dealer discounts.

New Raincoats

Modish touches reflecting the latest fashion trends and a certain restraint in the use of color combinations mark the newest German raincoats. Although checks, plaids, and stripes continue in favor, plain colors are more to the fore. Leading shades include reds, browns, and a soft green; while among the darker tints, navy blue predominates. In patterned cloths the latest novelties are self-patterned silks and overplaids. The leaning is distinct toward combining different tones of the same color; a very light tint with a very dark one is most in vogue; while the favored shades range from beige to brown.

Fine silks, crepe de chine, taffeta, and Liberty satin are used for formal coats. One particularly smart model has a standing convertible collar, raglan sleeves, a deep V-shaped inset in the back, and a wide belt at the natural waist-line. The collar and the revers are faced with two tones of a soft woolen material, and the same trimming is repeated on the cuffs and the novelty pockets. Straight-line models predominate. On these, raglan sleeves are generally found. Incidentally, raglan sleeves are perennial favorites in Germany for raincoats for both men and women. For summer wear appear coats in pastel shades of striped Liberty satin.

Company Notes

The Ekona A. G., with rubber and cocoa plantations in the Cameroons, Africa, produced 273,121 kilos of Hevea sheet and 26,870 kilos of scrap in 1929, a considerable reduction as compared with 1928 and 1927, when the output of Hevea sheets came to 316,165 and 352,-159 kilos respectively. A profit of 244,-228 marks was realized and a carry-forward of 390,738 marks from 1928; but owing to the condition of the rubber producing industry, no dividends were declared.

The Mannheimer Gummi-Guttapercha und Asbestfabrik, A. G., Mannheim, creditors have decided to sell the asbestos works, which are separate from the rubber factory. It is planned to reorganize the concern and reduce the capital.

The Lithopone Kontor has again reduced its price for the well-known LK, non-poisonous lithopones. Present quotations, consequently, are about 11 per cent lower than in April, 1930.

Russia

The four Russian rubber companies belonging to the Russian Rubber Trust: namely, the Treugolnik in Leningrad, Bogatyr and Kautschuk in Moscow, and Prowodnik in Jaroslawl, produced a total of 15,876 tons of rubber goods during the first quarter of 1930 as compared with a total of 12,482 tons in the first quarter of 1929. The goods included 12,558,000 pairs of rubber shoes against 10,544,000 in the corresponding period of 1929; 357,000 tires against 210,000; 3,754 tons of technical goods against 2,664 tons; 982 tons of asbestos goods against 1,064 tons. The total output for 1929 came to 50,938 tons, including 41,656,000 pairs of rubber shoes (according to the program there should have been 48,000,000 pairs), 1,021,000 tires (the program called for 1,540,000 tires), 11,265 tons of technical goods, and 4,027 tons of asbestos goods.

The Treugolnik employed 21,273 persons during the first quarter of 1930; the Bogatyr, 5,960; the Kautschuk, 1,876; and the Prowodnik 766; in all, 29,875 persons.

As the above figures show, the rate of production increased during the first three months of 1930, but the output still seems insufficient to supply the demand. Part of the increased demand is due to the deteriorated quality of the products, making them wear out more rapidly.

The Commercial Attache in Berlin reports that German rubber footwear dealers state that the Russian Rubber Trust is developing into a serious competitor of American rubber footwear. It seems that the trust, which as shown above, is producing about 50,000,000 pairs of footwear yearly, at the recent Berlin shoe exhibition offered shoes at 40 to 50 cents a pair for qualities that Americans usually sell at $1.25.

At the same time it is reported that the Soviets are openly stating that they will quote lower prices than any of their competitors under any and all conditions and are not concerned whether they are selling below cost or not.

Reports of Soviet dumping tires in the Baltic states and to a certain extent in Denmark are also in the air. While these may be exaggerated, it is well to make a note of this.

Czechoslovakia

Available statistics of rubber footwear exports from Czechoslovakia for the first eight months of 1930 show an enormous increase as compared with the amounts for the corresponding period of 1929. While in the latter period shipments abroad totaled 31,400 kilos or 31,590 pairs, these mounted to 223,000 kilos, or 449,352 pairs, in 1930. In addition 4,100 kilos of snow boots were exported. The 1930 figures not only show a remarkable spurt in Czechoslovakian business in rubber shoes, but also indicate a difference in the style of footwear exported; for while in 1929 the number of pairs practically corresponded with the weight in kilos, in 1930 the number of pairs was more than twice the weight.

An examination of monthly shipments shows very wide fluctuations. In August, 1930, for instance, 2,000 kilos of shoes were exported; while in July of the same year the figure was 116,000 kilos. Similarly in 1929 the lowest shipments, 400 kilos in May, compare with the highest in January, 13,000 kilos. In August of that year there was a new rise, to 6,000 kilos.

Holland

Holland's consumption of crude rubber during the first half of 1930 shows a marked decrease as compared with that for the first half of 1929. The respective figures are 2,535 and 3,243 tons. On the other hand practically every important item in the imports of manufactured goods showed increases. For instance, automobile tires numbered 148,406 instead of 99,963; motorcycle tires, 6,259 instead of 4,985; rubber footwear, 1,313,184 pairs instead of 932,228; and other rubber goods, 1,841 against 1,542 tons. Only tires for other than motor vehicles fell from 657,742 to 567,857, and tubes from 697,261 to 632,992.

America had the largest share in the imports of automobile tires, closely followed by Great Britain, which, however, supplied the largest number of tubes for these tires. But little Belgium seems to be getting most of Holland's orders for rubber goods and supplied more than half the other tires and tubes, half of the rubber boots and shoes, besides a fair quantity of other rubber goods. Germany's share in the imports appear to be increasing. Her exports of automobile tires to Holland practically doubled, she took second place as a source of tubes for other tires, and also of footwear, and had the largest part in the other rubber goods.

The most important exports from Holland are tires and tubes for other than motor vehicles. These exports increased in 1930. The figures for tires were 542,709 against 468,559, and for tubes, 564,921 against 435,502. The next important article, footwear, declined from 32,980 pairs to 29,737 pairs. Exports of automobile tires increased from 1,934 to 3,469.

The Rubber Industry in the Far East

MALAYA

Resources of Estates

An analysis of the length of life of about 600 rubber companies based on their liquid assets and all-in costs at the date of the last balance sheet has been published by the Rubber Growers' Association. No account was taken of the benefit resulting from forward sales or of the cultivation of any other product. It was found that surprisingly few concerns would be unable to continue with rubber selling at only 3d. per pound. A list containing the names of some of the stronger companies is given, including 47 concerns. Of these 13 could exist for 40 months and more with rubber at 3d. per pound, of these again six could exist for more than 50 months. The Labu company could last for 411 months with rubber at 5d. per pound, 115 months with rubber at 4d. per pound, and 67 months with rubber at 3d. per pound. This company had an all-in-cost at 5.39d. per pound, a figure reduced since then.

The cheapest producer on the list is Lumut, which had costs of 4.76d. per pound and could, therefore, produce at a profit with rubber at 5d. per pound. With rubber at 3d. its life was put at 54 months. Curiously enough the next cheapest producer, Narborough, having costs of 5.01d. per pound, would be able to exist only 8 months if rubber were 3d. per pound. Twenty of the firms had costs over 6d. and under 7d., eleven had costs between 7d. and 8d., eight between 5d. and 6d., six between 8d. and 9d., one between 4d. and 5d.; while the highest costs were those of Aengsono, amounting to 10.09d. per pound. The latter concern in spite of its high costs was credited with a life of 25 months with rubber selling at 3d. per pound.

Another analysis of the financial position of 421 companies was made by a firm of rubber brokers. From this it appears that 154 concerns have liquid resources of £10 or over per acre, 145 have £5 to £10 per acre, 77 have £2.10 to £5, and 45 have under £2.10s. per acre. Twenty-one concerns are already overspent. Since it is calculated that £2 to £4 per annum, according to conditions, would be sufficient to keep an estate in good order, if total cessation of tapping were decided upon, it is evident that the majority of rubber companies could keep going for some time whether they decided to tap at a loss or to stop production altogether.

Production Costs

The analysis of the position of 421 British rubber companies, referred to above, shows that about 60 per cent of the companies have all-in costs between 6d. and 8d. a pound, about 30 per cent have costs between 8d. and 10d. per pound, and 5 per cent have costs over 10d.; while another 5 per cent have costs under 6d. per pound. Only one company had costs over 1s. per pound, and one had costs under 5d. per pound. Since the publications of the reports, considerable economies have been effected.

A firm of brokers has ascertained that the true average cost of production is as follows: 243 estates show an average cost of 6.72d. per pound, six had costs under 5d., 58 under 6d., 94 under 7d., 50 under 8d., 22 under 9d., and 13 are over 9d. A comparison of these later figures with those given in the preceding paragraph clearly indicates the tendency to reduce costs. Whereas out of 421 companies in the earlier analysis only 5 per cent or 27 companies had costs under 6d. per pound, out of 243 companies in the later compilation, 58 companies, or about 24 per cent, had costs under 6d. per pound, and firms are talking of still further reductions.

Since such is the case, the question naturally arises, as to what level may rubber companies be expected eventually to bring their prices? The Dunlop Rubber Co. states that it expects to bring down its costs to under 3d. a pound, and one or two other companies have made similar announcements.

Definition of Costs

It should be remembered that costs involve more than the harvesting, preparing, and marketing of rubber. At all times are fixed charges as rents, assessments, fees to directors and agencies, which go on whether an estate is producing or not. These expenses make up nearly one-half the cost of producing rubber. Without such charges the majority of plantations could produce at 4d. per pound, as W. Shakespeare, chairman of the Ceylon Association, London, recently stated. The Chairman of the Kinta Kellas Rubber Estates said at a recent meeting of the company that on the firm's estates where such reductions had been made, in the majority of cases the cost of tapping, collecting, coagulating, preparing, packing, shipping, and getting the rubber on the market was only 2d. per pound.

Tapping Curtailed

The continuation of prices at an unremunerative level, combined with the fact that enforced restriction is at present out of the question, is resulting in an increasing number of companies resorting to a policy of selective tapping, where they have not decided to stop altogether. About 34 companies belonging to the Harrisons & Crosfield group have adopted the selective tapping system, and figures of outputs in October of this year show that, with the exception of five estates, all had smaller crops than in preceding Octobers.

Besides this group the Straits Rubber Co. and allied companies, representing a potential annual output of over 16,000,000 pounds, have decided to adopt a modified system of tapping, under which output will be reduced one-third. The following rubber estates are involved: Straits, Penang, Tali Ayer, Rubana, Sabrang, Bagan Serai, Batak Rabit, Kurau, Merchisron, and Glenshiel.

The North Borneo State, Bode, Roebourne, Sekong, Lower Segama, Majedie, Pahi, Permatang, R. E. Malaya, Serom, Stagbrook, Ceylon Amalgamated, Tanggu, and Batu estates have also announced a complete cessation of tapping, while the following will curtail tapping: Bangawan, Anglo-Dutch, Tenasserim, Chimpul, Third Mile, Deviturai, and Layang.

The directors of the Merlimau-Pegoh, Consolidated Eastern Plantations and Central Johore Rubber Estates have authorized a system of tapping estimated to reduce output by 23, and ultimately 30 per cent. The Craigielea Rubber Plantations will cut output by 30, and the Jasin (Malacca) Rubber Estates by 25 per cent.

Rational Cost Reduction

The drastic economies of the slump, however, may well point the way to rational and permanent economies. Most shareholders will agree with a writer in the *Malayan Tin & Rubber Journal*, who says that there are too many suckers (not in the American sense of the word), meaning directors, agents, visiting agents, auditors, European supervisors, hospitals. With a prolonged period of low prices, some change may be expected here. With regard to tapping costs, companies find that parts of their estates are so much less costly to exploit than others that they are concentrating on these, leaving the less productive areas alone, resulting in reduced tapping costs. Or very enterprising companies may decide to cultivate a different crop on their poorest areas.

In the matter of preparation, *Malayan Tin & Rubber Journal* has preached against what it calls pretty rubber and has advocated slabs that can be cheaply packed. In a recent issue it is suggested that the local government should send a representative to talk with American manufacturers and learn exactly what they want. O. de Vries, formerly of the Experiment Station, Buitenzorg, Java, for years urged the simplification of methods of preparation and advised producers to cooperate in central factories.

The reduction of price expected when the budded rubber comes into bearing is another matter. Buddings have brought many surprises to planters and may bring many more when exploited on a large scale. If estates are reorganized so that overhead is considerably reduced, the advantage of buddings on that side would be lessened. Tapping costs will, of course, be lower, but not in proportion to the output, because greater care in tapping buddings will be required and fewer of these trees will be assigned to each Coolie as his task.

NETHERLANDS EAST INDIES

Dutch vs. Malayan

The harmony brought about between producers in Malaya and the Dutch East Indies by their joint efforts toward obtaining restriction has been disturbed by the Governor-General of the N. E. I. rejecting the restriction proposals. Some papers in Malaya are indulging in rather heated talk of retaliation. Individuals have suggested boycotting certain Dutch goods and threats of a finish fight are in the air.

The news that the London directors of the British estates, Telgoredjo, Gledagan Pantjoer, and Soember Pakel, have dismissed the Dutch managers and replaced them by Englishmen, is regarded as retaliation for the Dutch refusal to enforce restriction. Several other British companies in West Java have dismissed their Dutch assistants, and it is expected that more will follow suit.

The Dutch planters are not saying a great deal. This reticence may be due to the fact that many Dutch producers feel that they are so far ahead of Malaya regarding scientific planting that in a finish fight they would obtain the upper hand.

Malayan Advantages

The folly of indulging in a false sense of security is exposed by the *Deli Courant*, which points out that the producers in Malaya have set themselves to the task of producing as cheaply as possible. Figures are quoted showing the financial strength of these British concerns and disclosing cost prices calculated to astonish the East Coast of Sumatra planter. The conclusion is that the condition of the producers in Malaya is not so unfavorable as many Dutch producers like to believe.

In comparing the Dutch position with that of the Malayan planter, the former, especially in Sumatra, is at a disadvantage as regards labor, while, in addition, the Dutch estates are subject to all kinds of levies from which the producer in Malaya is exempt. Finally, money has been spent too freely in Sumatra toward giving estates a parklike appearance, which in these days is an extravagance.

Cutting Costs

The subject of costs was also discussed at a meeting of planters at Buitenzorg. Van Holst Pellekaan, the chairman, pointed out that the struggle was mainly between the native and the European producer and that reduction of costs to the lowest level possible was of cardinal importance. Reports had been published in the local press to the effect that natives in Borneo and Sumatra were felling rubber trees in order to plant other crops, but the speaker warned against attaching too much importance to this report.

General costs were too high, he said, amounting frequently to 20-30 guilders per bouw (guilder = $0.40, bouw = 1.754 acres), producing 625 pounds. He did not believe in cutting salaries, but suggested that the European staff be reduced to a minimum and vacancies be filled by natives and not Europeans.

As to upkeep, the speaker agreed with those who decried the expense wasted in the attempt to make a rubber estate look like a park; green manures, too, were expensive, and possibly they would eventually be replaced by grasses. In this connection he called attention to a new herb, Paria, (*Momordica Charantia*), which is a most economical cover that grows very rapidly, keeps the soil in good condition, and destroys harmful weeds in a minimum of time.

In the upkeep of young Hevea and the making of nursery beds, no economies should be attempted, and here the speaker urged planters to rejuvenate their estates. His statement that combating pests and diseases is expensive and that the affected trees should be cut down was debated by Ostendorf of the Experiment Station. Van Holst Pellekaan held the view that high outputs should be obtained from first-class planting material and should not be sought by upkeep, combating diseases, etc. In other words, he was of opinion that the extensive method of exploiting Hevea was the best.

When it came to preparing rubber, sheet was recommended as cheaper to prepare than crepe, the initial expense for sheet preparation being less and the packing costs lower. The possibilities of central factories for the finishing of rubber were also mentioned.

Another planter present declared that estates should aim to produce not less than 2,000 pounds per bouw (1,140 pounds per acre), that in future estates producing less were doomed, and that every planter is duty bound to take up rejuvenation.

Hevea Manurial Experiments

In the *Archief voor de Rubbercultuur* of September, 1930, J. Grantham presents a paper giving the continued results over the last three years of the second nitrate manuring experiment, the previous results of which were communicated in former papers appearing in the same publication in 1924 and 1927.

In the period under review, which covers the ninth year of the experiment, March, 1927-February, 1928, the tenth year, 1928-1929, and the eleventh year, 1929-1930, all plots showed considerable increases in yields as compared with former years, except during the eleventh year when, with the exception of the Series B, the outputs were all a few pounds below the yields for the tenth year. The actual difference in yield is inappreciable, but the steady increase characteristic of the last few years did not take place. Whether this fact indicates that the maximum results have now been obtained, or whether the halt is merely temporary, owing to the abnormally dry weather, is yet to be decided.

The experimental plots were divided into five series: A, the control plots; B, plots not regularly manured until 1926, since when they received 4 pounds of ammonium sulphate per tree per annum; C, plots receiving an annual application of 5 pounds of sodium nitrate per tree; D, plots receiving 2 pounds of ammonium sulphate per tree once in two years since 1925; E, plots manured with 4 pounds of ammonium sulphate every other year. The yields for the plots during the three years mentioned were: A, 307, 361, and 358 pounds per acre; B, 426, 531, and 546 pounds per acre; C, 672, 764, and 757 pounds per acre; D, 472, 530, and 525 pounds per acre; E, 574, 671, and 656 pounds per acre. The remarkably high yield per acre, 764 pounds, of plot C, during the tenth year is noteworthy.

New experiments were conducted on red soil. Earlier experiments had shown that various artificial manures, including sodium nitrate, used on red soil, produced no significant effect in either the yield or the appearance of the trees, quite unlike the results obtained on white soil. On the red soil the yield and the growth of the trees were quite satisfactory without manure. However it has been observed that when trees on red soil reach the age of from 12-15 years, deterioration gradually sets in; the leaves are less healthy in appearance; bark renewal is less satisfactory; and yield falls off. Consequently in 1926 an experiment was laid out in 15-year-old rubber. The plots were divided into four series: A, control; B, manured with 4 pounds of ammonium sulphate per tree annually; C, manured with 5 pounds of sodium nitrate per tree annually; and D, manured with 5 pounds of nitrate sodium in alternate years.

In the first year the appearance of the trees showed improvement, but not the yield; in the second definite improvement in foliage and an increase in yield amounting to about 6 per cent was found; during the third year still greater improvement in yields was recorded and this continued into the fourth year. The best of the series is B, which gave a yield of 18 per cent more than the control in the fourth year.

At present, with the low prices prevailing, the increase in yield barely covers the cost of manuring, but it is expected that in subsequent years still further improvement in yields will be shown.

N. E. I. Notes

The Deli Planters' Association has asked its members to observe four holidays during the month instead of the customary two falling on the first and the sixteenth of each month. Instead of the latter free days, a free Sunday is to be observed every other week, and for those who wish it the other two free days may be on Sunday, too. It is intended to make withholding the two extra free days punishable.

The *Deli Courant* learns that the Firestone company closed its offices at Medan on November 1, probably because rubber prices are higher there than in Singapore.

Packing Rubber. The holder of the patent for the method of packing rubber by first wrapping it in sheets of the same quality of rubber, is taking action against the rubber producers in the Netherlands East Indies, who have been adopting this method for some years. Producers have been informed that they must either pay damages to the extent of 25,000 guilders for every infringement of the patent, or else obtain a license. The outcome of the case is of great importance to rubber producers, since this method of packing has been made obligatory by the terms of American buyers.

Patents, Trade Marks, and Designs

Machinery

United States

1,776,353.* **Sole-Stock Machine.** This invention provides an apparatus by which calendered rubber sheet soling stock may be built up by plies added along one edge of the sheet to a desired thickness for the heel portions of the soles. This is done by cutting one or more strips from the calender and directing them in place by the action of cone pully idlers and then calendering them to position on the sheet of stock. E. W. Dunbar, Hudson, and E. J. Dempsey, W. Medford, assignors to Cambridge Rubber Co., Cambridge, all in Mass.

1,776,510.* **Automobile Floor.** A unitary floor construction consists of a rigid member covered with rubber vulcanized to it. All squeaking and rattling of the floor boards are obviated by the use of rubber. W. C. Keys, Detroit, Mich., and A. J. Brown, Lakewood, assignors to Mechanical Rubber Co., Cleveland, both in O.

1,777,310.* **Vulcanizing Press.** The outstanding feature of this press is that it provides means for applying the motive fluid beneath the entire effective area of the platen, thereby obtaining a very high compressing effect at ordinary fluid pressures and a more uniform compacting of the work within the press. E. Hopkinson, assignor to New York Belting & Packing Co., New York, N. Y.

1,777,313.* **Trimmer.** This machine combines a device for clamping large rubber slabs to be trimmed and manually to guide them accurately through the trimmer with minimum attention on the part of the operator. W. J. Kent, Brooklyn, N. Y., assignor to Mechanical Rubber Co., Chicago, Ill.

1,777,405.* **Tire Building Drum.** This drum is adapted for building flat band tires. It is featured by a flexible periphery envelope enclosing an air chamber adapted to be held expanded by air pressure and to be collapsed by suction applied to the chamber. P. A. Frank, Akron, O.

1,777,486.* **Electric Tire Mold.** This is a novel arrangement of electric heating units interposed between the inner and the outer mold members in a position where the heat generated will be confined within the outer mold members and be transmitted directly to the inner mold members. A. A. Glidden, T. M. Knowland, and W. R. Dow, all of Watertown, Mass., assignors, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,777,648.* **Circulating Dispersions.** The objects of this invention are to circulate liquid dispersions or emulsions of rubber to maintain them in uniform condition and to avoid or remove the effects of flocculation, coagulation, or separating out of constituents of different specific gravities. R. F. McKay, H. Willshaw, W. G. Gorham, and P. F. Lee, all of Birmingham, England, assignors to American Anode, Inc., New York, N. Y.

1,778,071.* **Tire Mold.** This relates to vulcanizing tires with small transverse apertures through a comparatively heavy tread portion. A. J. Fleiter, assignor to Lambert Tire & Rubber Co., both of Akron, O.

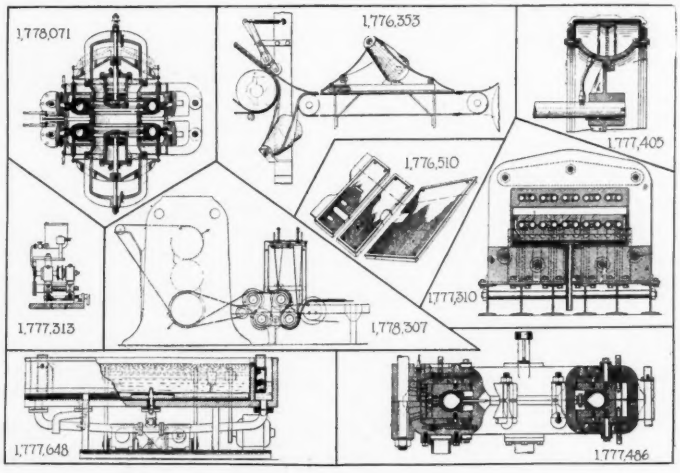
1,778,307.* **Laminating Apparatus.** This is intended for the manufacture of sheet rubber for the subsequent manufacture of tubes for pneumatic tires especially in connection with the full molded tube process. A. C. Bowers and W. E. Humphrey, both of Kent, assignors, by mesne assignments, to National Rubber Machinery Co., Akron, all in O.

1,778,183. **Tire Repairing Unit.** W. B. Burke, assignor to Electric Vulcanizing Rubber Co., both of Cleveland, O.

1,778,411. **Dental Vulcanizer Attachment.** B. H. Abert, Milwaukee, Wis.

1,778,500. **Mold Forming Apparatus.** O. J. Kuhlke, assignor to National Rubber Machinery Co., Akron, O.

* Pictured in group illustration.



Dominion of Canada

304,419. **Tire Spreading Machine.** National-Standard Co., Niles, Mich., assignee of A. C. Hopkins, Waukegan, Ill., both in the U. S. A.

304,423. **Bias Cutting Machine.** Seiberling Rubber Co., assignee of H. S. Alexander and F. B. Pfeiffer, all of Akron, and J. W. White, Barberton, all in O., U. S. A.

304,576. **Hollow Article Core.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of G. W. Trobridge, Birmingham, both in England.

304,586. **Mold Cleaning Apparatus.** Goodyear Tire & Rubber Co., assignee of G. G. Andrews, both of Akron, O., U. S. A.

304,767. **Molding Press.** Canadian I. T. S. Rubber Co., Ltd., assignee of L. J. Clayton, both of W. Toronto.

304,785. **Golf Ball Tester.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of T. Cropper, Birmingham, both in England.

304,856. **Battery Box Press.** R. M. Taylor, Boston, Mass., assignee of J. A. Lindenborg, Indianapolis, Ind., both in the U. S. A.

304,975. **Steering Wheel Former.** H. A. Husted Co., Detroit, Mich., assignee of H. A. Husted, Cleveland, O., both in the U. S. A.

United Kingdom

333,331. **Depositing Rubber from Dispersions.** Dunlop Rubber Co., Ltd., London, and E. W. B. Owen, Fort Dunlop, Birmingham.

333,542. **Web Feeding Apparatus.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, Fort Dunlop, Birmingham.

Germany

509,200. **Belting Connector.** Continental Gummiwerke A. G., Hannover.

509,888. **Chamfering Soles.** K. Schmid, Lausanne, Switzerland. Represented by M. Singelmann, Berlin S. E. 48, and F. C. Boetticher, Gorlitz.

509,979. **Belting Cutter.** C. Matthaei, Offenbach a. M.

510,234. **Braider.** G. Krenzler, Wuppertal-Barmen.

510,247. **Rubber Saw Guide.** G. Osselmann, Koln-Ehrenfeld.

510,739. **Electric Vulcanizer.** W. Baum and P. Felgentreff, both of Egeln.

510,838. **Belt Press Adjuster.** G. Siempelkamp & Co., Krefeld.

Designs

1,136,983. **Nail Remover.** K. Scholz, Pritzwalk.

1,137,145. **Cycle Tire Vulcanizer.** M. Muller Maschinen-und-Formenfabrik, Hannover-Hainholz.

1,137,245 and 1,137,246. **Molds.** Brunotte & Niemeyer, Am Brinker Hafen, Hannover.

1,138,806. **Tire Testing Machine.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin, S. W. 11.

1,139,830. **Rubber Mill.** M. Roca and E. Guix, both of Barcelona, Spain. Represented by M. Wagner and G. Breitung, both of Berlin S. W. 11.

Process

United States

1,776,622. **Dummy Sweetmeat.** T. and W. Errington, both of Portsmouth, England.

1,776,748. **Fabricating Unwoven Material.** G. Bloch, New York, N. Y.

1,777,544. **Shoe Stiffener Latex Coating.** H. H. Beckwith, Brookline, Mass.

1,778,185. **Printer's Blanket.** F. E. De Vries, Evanston, Ill., assignor, by mesne assignments, to Vulcan Proofing Co., Inc., Brooklyn, N. Y.

1,778,270. **Sponge Rubber Article.** T. W. Miller, assignor to Faultless Rubber Co., both of Ashland, O.

Dominion of Canada

304,431. **Soles.** Trelleborgs Gimmifabriks A/B, Trelleborg, Sweden, assignee of S. A. J. Holmquist, London, W. 1, England.

304,515. **Tire Wheel.** A. J. Musselman, Akron, O., U. S. A.

304,588. **Tire Repair.** Goodyear Tire & Rubber Co., assignee of C. H. Zimmerman, both of Akron, O., U. S. A.

304,826. **Coloring Toy Balloons.** Pioneer Rubber Co., assignee of J. C. Gibson, both of Willard, O., U. S. A.

United Kingdom

332,303. **Electric Cable Covering.** L. J. Ransom and H. E. Sewell, both of Derby.

333,005. **Thread.** Dunlop Rubber Co., Ltd., London, E. A. Murphy, and D. F. Twiss, both of Fort Dunlop, Birmingham.

Germany

510,512. **Making Rubber Goods.** Veritas Gummiwerke A. G., Berlin-Lichterfelde.

510,837. **Footwear.** H. C. L. Dunker, Helsingborg, Sweden. Represented by G. Lotterhos, Frankfurt a. M., H. Mortensen and W. von Sauer, both of Berlin S. W. 11.

511,079. **Bicycle Tires.** I. G. Farbenindustrie A. G., Frankfurt a. M.

Chemical

United States

1,776,857. **Composition.** Rubber, rosin oil, and rosin pitch. I. W. Humphrey, Wharton, N. J., assignor to Hercules Powder Co., Wilmington, Del.

1,777,045. **Latex Treatment.** J. Mc Gavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,777,157, 1,777,158, 1,777,159, 1,777,160, 1,777,161, 1,777,162. **Adhesive Compositions.** A. Biddle, Trenton, N. J., assignor to United Products Corp. of America, a corporation of Del.

1,777,352. **Age Resister.** C. J. T. Cronshaw and W. J. S. Naunton, assignors to British Dyestuffs Corp., Ltd., all of Blackley, Manchester, England.

1,777,634. **Age Resister.** C. W. Bedford, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,777,646. **Aqueous Dispersion.** P. Klein, and S. Gotléb, both of Budapest, Hungary, and A. Szegvári, assignors to American Anode, Inc., both of Akron, O.

1,777,737. **Accelerator.** W. Scott and W. P. TER Horst, assignors to Rubber Service Laboratories Co., all of Akron, O.

1,777,738. **Accelerator.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,777,833. **Application of Latex.** A. Ferretti, Milan, assignor to Societá Invenzioni Brevetti Anonima Torino, Turin, both in Italy.

1,777,874. **Accelerator.** S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,777,945. **Latex Treatment.** F. H. Untiedt, Chevy Chase, Md.

1,777,960. **Accelerator.** S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,778,548. **Age Resister.** W. S. Calcott and W. A. Douglass, both of Penns Grove, N. J., and M. A. Dahlen, assignors to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

1,778,707, 1,778,708, 1,778,709. **Accelerator.** S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

Dominion of Canada

304,399. **Age Resister.** I. G. Farbenindustrie A. G., Frankfort a. M., assignee of W. Kropp, Elberfeld, and L. Rosenthal, Vohwinkel, all in Germany.

304,577. **Rubber Crumb.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of E. A. Murphy and D. F. Twiss, both of Birmingham, all in England.

304,582. **Artificial Rubber.** I. G. Farbenindustrie A. G., Frankfort a. M., assignee of E. Tschunkur and W. Bock, both of Koln-Mulheim, all in Germany.

304,587. **Liner Processing.** Goodyear Tire & Rubber Co., Akron, O., assignee of P. Beebe, Los Angeles, Calif., both in the U. S. A.

304,788. **Synthetic Rubber Vulcanization.** I. G. Farbenindustrie A. G., Frankfort a. M., assignee of G. Ebert and R. Denminger, both of Ludwigshafen-on-Rhine, all in Germany.

United Kingdom

332,489. **Anticracking Preservative.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of S. I. Strickhouser, Passaic, N. J., both in the U. S. A.

332,525. **Sponge Rubber.** Dunlop Rubber Co., Ltd., London, W. H. Chapman, D. W. Pounder, and E. A. Murphy, all of Fort Dunlop, Birmingham.

332,526. **Sponge Rubber.** Dunlop Rubber Co., Ltd., London, E. A. Murphy and E. W. B. Owen, both of Fort Dunlop, Birmingham.

332,537. **Rubber Composition.** P. H. W. Cloud, Bradford, Yorkshire.

332,557. **Colloidal Pastes.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

332,762. **Isomerizing Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

332,764. **Age Resister.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.

332,891. **Electric Insulation.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

333,047. **Paving Blocks.** Dunlop Rubber Co., Ltd., London, H. C. Young, F. W. Warren, and F. H. Toop, all of Manchester.

333,174. **Accelerator.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

333,268. **Pile Fabrics.** A. J. Stephens, London. (Collins & Aikman Corp., Philadelphia, Pa., U. S. A.)

333,290. **Electric Insulation.** W. S. Smith, Newton Poppleford, Devon, H. J. Garnett, Seven-oaks, and J. N. Dean, Orpington, both in Kent.

333,391. **Latex Treatment.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of E. Hazel, New York, N. Y., both in the U. S. A.

Germany

509,553. **Rubber Compounds.** M. S. Stutchbury, London, England. Represented by F. Cochlovius, Frankfurt a. M.

509,980. **Electro Depositions.** Anode Rubber Co., Ltd., London, England. Represented by M. Wagner and G. Breitung, both of Berlin S. W. 11.

511,056. **Inflating Material.** I. G. Farbenindustrie A. G., Frankfurt a. M.

511,087. **Utilizing Old Rubber.** Warren Bros. Co., Cambridge, Mass., U. S. A. Represented by W. Karsten and C. Wiegand, both of Berlin S. W. 11.

511,145. **Artificial Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M.

511,477. **Nitrocellulose Rubber Solutions.** I. G. Farbenindustrie A. G., Frankfurt a. M.

511,540. **Eliminating Fluid Polymerization.** I. G. Farbenindustrie A. G., Frankfurt a. M.

General

United States

1,776,305. **Doorstop.** C. Verch, Albany, N. Y.

1,776,382. **Cloth Expander.** E. Farrell, Salford, England.

1,776,489. **Powder Distributer.** C. M. Cobb, Lynn, Mass.

1,776,510. **Automobile Floor.** W. C. Keys, Detroit, Mich., and A. J. Brown, Lakewood, assignors to Mechanical Rubber Co., Cleveland, both in O.

1,776,588. **Antiskid Device.** A. Kahlow, Mayville, and W. H. Markham, Horicon, both in Wis.

1,776,728. **Tire Antiskid Device.** E. Harvey, Wall, Pa.

1,776,879. **Impregnated and Coated Fabric.** G. Baekeland, Scarsdale, assignor to Bakelite Corp., New York, both in N. Y.

1,777,278. **Dust Gun.** H. O. Huntington, assignor to H. O. Benedict, both of Seattle, Wash.

1,777,413. **Safety Swimming Device.** F. N. Mikus, Youngstown, O.

1,777,421. **Collar.** H. F. Waters, St. Louis, Mo.

1,777,443. **Gasket.** C. R. Mastin, Midland Park, N. J.

1,777,477. **Pneumatic Air Cushion.**

R. W. Sampson, New York, N. Y.

1,777,483. **Sharp Freezing Container.** L. G. Copeman, assignor to Copeman Laboratories Co., both of Flint, Mich.

1,777,558. **Pneumatic Shoe Sole.** H. A. Freeman, Los Angeles, Calif.

1,777,676. **Shoe Resoling Press.** E. J. Pelletier, Brooklyn, N. Y.

1,777,864. **Cog Belt.** C. R. Short, assignor to General Motors Research Corp., both of Detroit, Mich.

1,777,915. **Polisher.** R. Douglas, Brooklyn, N. Y.

1,777,984. **Packing.** C. W. Quimby, assignor to E. F. Houghton & Co., both of Philadelphia, Pa.

1,778,024. **Chassis Unit Support.** R. F. Cowell, Teaneck, N. J., assignor to International Motor Co., New York, N. Y.

1,778,028. **Vehicle Unit Mounting.** M. C. Horine, Grasmere, assignor to International Motor Co., New York, both in N. Y.

1,778,089. **Heel Plate.** J. Pomerantz, Englewood, N. J.

1,778,090. **Nasal Applicator.** F. W. Schoonmaker, Jr., Caldwell, N. J.

1,778,110. **Flexible Upright Marker.** M. E. Hartzler, Downers Grove, and E. P. Romilly, Chicago, both in Ill.

1,778,121. **Window Cleaner and Drier.** E. H. Paull, Seattle, Wash., assignor to W. Gordon, doing business as Gordon Mfg. Co., New York, N. Y.

1,778,171. **Storage Battery Container.** A. H. Snyder, Lancaster, assignor to Gould Storage Battery Co., Inc., New York, both in N. Y.

1,778,197. **Joint Mechanism.** H. C. Lord, Erie, Pa.

1,778,285. **Hose Supporter.** W. Vorwerk, Barmen, Germany.

1,778,470 and 1,778,471. **Surfacing Apparatus.** H. R. Stratford, assignor to Stratmore Co., both of Cleveland, O.

1,778,490. **Book.** A. L. Grammer, Glenside, Pa.

1,778,503. **Vibration Dampening Mounting.** H. C. Lord, Erie, Pa.

1,778,545. **Bottle Holder.** P. E. Allen, Niles Center, Ill.

1,778,592. **Galosh Heel Plate.** B. W. Gruber, Council Bluffs, Iowa.

1,778,657. **Mercury Rectifier Seal.** S. Aoki, Hiratsuka, Japan, assignor to General Electric Co., a corporation of N. Y.

1,778,683. **Arch Supporter.** M. C. Messler, assignor to M. C. Messler, both of Providence, R. I.

1,778,686. **Tire Repair Tool.** N. A. Plummer, Portland, Me.

Dominion of Canada

304,323. **Cigar Extinguisher.** C. H. Corrigan, Phoenix, Ariz., U. S. A.

304,330. **Hair Curling Box.** P. E. Gaire, New York, N. Y., U. S. A.

304,346. **Addressing Machine.** J. Krell, Berlin-Zehlendorf, Germany.

304,448. **Change Gearing.** J. Eggenberger and J. Burkhard, assignees of E. Rieder, all of Ravensburg, Wurttemberg, Germany.

304,647 and 304,648. **Horseshoe Caulk.** W. H. Krug, Taycheeda, and C. G. Akerberg, co-inventors, Oshkosh, both in Wis., U. S. A.

304,725. **Heel Grip.** C. R. Snow, Ketchikan, Alaska.

304,884. **Respirator.** J. R. Gibbs, New York, N. Y., U. S. A.

304,978. **Bathing Cap.** Leyland & Birmingham Rubber Co., Ltd., Leyland, assignee of R. W. Lunn, Preston, both of Lancashire, England.

304,994. **Rubber Covering Material.** Rub-A-Flores (Foreign Rights) Syndicate, Ltd., assignee of M. M. Dessau and S. L. Flores, all of London, England.

United Kingdom

332,233. **Sea Battery Electrode.** J. K. M. Harrison, Ogontz, Pa., U. S. A.

332,248. **Golf Club.** A. G. Spalding & Bros. (British), Ltd., Putney, London. (W. F. Reach, Springfield, Mass., U. S. A.)

332,300. **Shaving Brush.** M. L. Bramson, London.

332,407. **Tools for Decorating.** F. Collyer, Tooting, London.

332,509. **Fishing Tackle.** D. Black, Newlands, Glasgow, Scotland.

332,574. **Spare Tire Cover.** E. P. Borman, Chicago, Ill., U. S. A.

332,582. **Head Protector.** R. Leonhardt, Grünberg, Silesia, Germany.

332,612. **Pipe Cleaner.** H. Burton, Smethwick, Staffordshire.

332,646. **Screw Propeller.** H. C. Watts, Croydon.

332,653. **Hot Water Bottle.** Dunlop Rubber Co., Ltd., L. Brown, both of London, and F. W. Warren, Manchester.

332,674. **Scouring Pad.** J. J. Brell, New York, N. Y., U. S. A.

332,711. **Vehicle Sliding Panel.** W. Dickens, Loughborough, Leicestershire.

332,770. **Hot Water Bottle.** F. C. Jones, Paddington, London.

332,795. **Tire Pressure Gage.** H. Leo, Gera, Thüringia, Germany.

332,796. **Siphon.** T. Haywood, Clayton, Manchester, and J. Vickers, Wilmslow, Cheshire.

332,812. **Thread Winding Reel.** W. W. Triggs, London. (F. Clouth Rheinische Gummiwarenfabrik Akt.-Ges., Nippes, Cologne, Germany.)

332,829. **Vehicle Door.** W. H. Bishop, Birmingham.

332,880. **Electric Cable.** Felten & Guilleaume Carlswerk Akt.-Ges., Mülheim, Cologne, Germany.

332,909. **Sound Recording Device.** A. F. Sykes, New Barnet, Hertfordshire.

332,914. **Percussive Drill.** Holman Bros., Ltd., Camborne, Cornwall. (Johannesburg Consolidated Investment Co., Ltd., Johannesburg, South Africa.)

332,927. **Threshing Machine.** F. P. Ryder, Niagara Falls, N. Y., U. S. A.

332,933. **Wheel Load Equalizer.** Soc. Anon. Des Anciens Etablissements L. Laisne, Nantes, France.

332,953. **Cork Paneling.** J. P. S. Smith, Oxton, and H. T. Tomkins, Rock Ferry, both of Cheshire.

332,981. **Brake Protector.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and W. L. Avery, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, both of London.

332,994. **Hat.** S. C. Tress, London.

333,028. **Hand Brush.** E. L. Tillotson, Maida Vale, London.

333,057. **Vehicle Body Mounting.** M. I. Daste, Seine, France.

333,068. **Door Check.** A. C. Earhart, Cleveland Heights, O., U. S. A.

333,070. **Wheel.** H. Hill, Bradford, Yorkshire.

333,104. **Gramophone Diaphragm Stamper.** T. H. Parker, Bosham, Sussex.

333,181. **Heel.** G. S. Shaw, Wallasey, Cheshire.

333,228. **Jar Closure.** J. H. Marston, Leicester.

333,251. **Vehicle Buffers.** G. Spencer, Moulton & Co., Ltd., and J. C. Spencer, both of Westminster.

333,265. **Upholstery Spring Surface.** J. W. Varley, Huddersfield.

333,357. **Gas Main Stopper.** Weston, Shipley & Weston, Ltd. and A. H. Shipley, both of Leicester.

333,358. **Motor Vehicle Body.** F. H. Royce, Derby.

333,389. **Mattress.** O. H. Thorp, Newton, N. J., U. S. A.

333,446. **Brake Protector.** R. J. Givens, Nampa, Ida., U. S. A.

333,498. **Electric Cable.** Naamlooze Vennootschap Hollandsche Draad-en Kabelfabriek, Amsterdam, Holland.

333,499. **Swimming Appliance.** G. Sauer, Habendorf, Eulengebirge, Germany.

333,549. **Tire Repair Plug.** W. J. Wesseler, E. Cleveland, O., U. S. A.

333,626. **Pipe Joint.** Hosier Open Air Pure Milker, Ltd., and A. J. Hosier, both of Marlborough, Wiltshire.

333,633. **Liquid Meters.** N. Swindon, Acton, London.

333,634. **Printing Process.** Gramophone Co., Ltd., Hayes, and A. Whitaker, W. Drayton, both of Middlesex.

333,647. **Respirator.** R. H. Davis, London.

333,681. **Footrings for Cans, Etc.** A. Bowman, Blaydon-on-Tyne.

333,695. **Drain Pipe Cleaner.** H. Graves and W. Miller, both of Los Angeles, Calif., U. S. A.

333,738. **Bed Rests.** G. D. L. Greenwood, Storrington, Sussex.

333,746. **Raincoat.** L. N. Goldson, Liverpool.

333,780. **Tire Inflating Valve.** C. S. Burton and G. S. Storey, both of Santa Monica, Calif., U. S. A.

333,782. **Tire Deflation Indicator.** F. Schwien, Berlin, Germany.

333,841. **Vehicle Shock Absorber.** L. Trescartes, Lido, France.

Germany

510,237. **Syringe.** J. Friedländer Gummiwaren-Fabrik G. m. b. H., Berlin O. 112.

510,284. **Tire Cover.** Kalle & Co., A. G., Biebrich a. Rh.

510,763. **Driving Belt.** H. Hennig, Mannheim-Neckarau.

510,938. **Elastic Bandage.** A. Pfuller, Zeulenroda.

Designs

1,135,813. **Automobile Block Belt.** V. Berulla, Gleiwitz, O. S.

1,135,941. **Heel.** Phillips Rubber Soles, Ltd., London, England. Represented by G. Loubier, F. Harmsen, F. Vollmer, and E. and W. Meissner, all of Berlin S. W. 61.

1,136,030. **Sport Shoe.** Veritas Gummiwerke A. G., Berlin-Lichterfelde.

1,136,449. **Sponge Bath Mat.** H. Lindemann, Berlin S. W. 68.

1,136,594. **Sponge Shoe.** Masonia Rubber Works, G. m. b. H., Wandsbek.

1,136,763. **Mat.** Gummiwarenfabrik Rud. Marx & Co., Hannover.

1,137,017. **Ship Fender.** W. Mellenthin, Boyadel, Kr. Grunberg i. Schles.

1,137,446. **Spherical Toy.** G. Feisenberger, Frankfurt a. M.

1,137,749. **Balloon.** G. Feisenberger, Frankfurt a. M.

1,137,836. **Motorcycle Handle.** A. G. Metzeler & Co., Munich.

1,138,248. **Shoe Protector.** H. Klein, Hamburg 23.

1,138,455. **Ruler with Suction Strip.** M. Hilger, Koln-Ehrenfeld.

1,138,466. **Cushion.** Continental Gummiwerke A. G., Hannover.

1,138,507. **Brush.** H. Kuhn, Inh. F. Littmann, both of Berlin-Pankow.

1,138,710. **Foam Rubber Cushion.** M. Strasser, Erfurt.

1,138,723. **Hot Water Bottle.** D. Ruter, Altenhagen, Schaumburg-Lippe.

1,139,056. **Typewriter Key Protector.** C. Wette, Essen, Ruhr.

1,139,092. **Carpet.** "A. G. A.," Anonima Gomma Affini, Milan, Italy. Represented by O. Arendt, Berlin W. 15.

1,139,140. **Friction Wheel Drive.** M. Schwarzmann, Hannover.

1,139,189. **Apron.** Lincas Gummiwaren-Fabrik G. m. b. H., Berlin-Charlottenburg.

1,139,639. **Gaiter.** W. F. Thiele, Leipzig-Gohlis.

1,139,669. **Shoe.** Maschinenfabrik Moenus A. G., Frankfurt a. M.

1,140,040. **Rubber Plaque.** Liga Gummiwerke A. G., Frankfurt-a. M.-Hausen.

1,140,093. **Sponge Mat.** H. Lindemann, Berlin S. W. 68.

1,140,330. **Rain Hood.** Firma M. Steinberg, Koln-Braunsfeld.

1,140,352. **Sponge Pad.** E. Blindauer, Hamburg 24.

1,140,676. **Massaging Glove.** Siemens-Elektro-Osmose G. m. b. H., Berlin-Siemensstadt.

1,140,851. **Brush.** Emsa Werke A. G., Rostock i. Mecklb.

1,141,046. **Tank Protective Disk.** C. H. Bruckner, Stutzengrun i. S.

Trade Marks

United States

275,319. Representation of a propeller between the words: **"Flight Commander."** Golf balls. Klin-McGill Golf Mfg. Co., Valparaiso, Ind.

275,400. **Mercury.** Tires and inner tubes. United Tire Stores Corp. of America, New York, N. Y.

275,402. **Fumex.** Belts and belting of rubber and fabric. B. F. Goodrich Co., New York, N. Y.

275,404. Representation of a blue and gold flag. Rubber bands. Goodyear Tire & Rubber Co., Akron, O.

275,405. **Pooh Bear.** Erasers. Joseph Dixon Crucible Co., Jersey City, N. J.

275,520. **Darex.** Rubber-bonded packing material for use as gaskets and the like. Dewey & Almy Chemical Co., N. Cambridge, Mass.

275,583. **Seminole.** Golf balls. Miller & West, Inc., Coral Gables, Fla.

275,639. **Mercury.** Jars, cells, covers, vents, and separators made of hard rubber or other plastic materials, not including glass for storage batteries. American Hard Rubber Co., Hempstead, N. Y.

275,725. Word: **"Ace"** to right of representation of a spade containing the letter: **"A."** Gaskets and washers. American Hard Rubber Co., New York, N. Y.

275,792. **"Jiffy."** Hot water bottles. I. B. Kleinert Rubber Co., New York, N. Y.

275,889. Initials: **"JM"** on a black background. Rubber and asbestos products. Johns-Manville Corp., New York, N. Y.

275,913. **Pro's Own.** Golf balls. A. W. East, Elmhurst, Ill.

275,926. Representation of a blue and gold flag. Washing machine wringer rolls, and dolly wings. Goodyear Tire & Rubber Co., Akron, O.

275,945. **Dynamite.** Golf balls. F. J. McCann Packing Co., Inc., Salinas, Calif.

275,954. Seal containing the word: **"United."** Inner tubes for tires. A. Meyerowitz, doing business as Brooklyn Tire Exchange, Brooklyn, N. Y.

275,989. Word: **"Ace"** to right of representation of a spade containing the letter: **"A."** Hard or soft rubber, solid, lined, or covered equipment for chemical process industrial uses. American Hard Rubber Co., New York, N. Y.

276,118. Circle, and inside a double circle containing the letter: **"F."** Pneumatic tire treads, tire and tube patches, tubing, repair airbags, and fan belts, all wholly or partly of rubber. Fisk Rubber Co., Chicopee Falls, Mass.

276,119. Representation of a smiling boy about to retire, holding a tire in his right hand and a lighted candle in his left. Tires and parts thereof, tire and tube repair outfits, tire flaps, belts and belting, and tire covers made of waterproofed fabric. Fisk Rubber Co., Chicopee Falls, Mass.

276,120. Circle containing the letter: **"F."** Annular and sectional repair bags and bag fillers, radiator hose, tire repair plugs and patches, all wholly or partly of rubber. Fisk Rubber Co., Chicopee Falls, Mass.

276,124. Representation of a blue and gold flag. Unvulcanized rubber gum. Goodyear Tire & Rubber Co., Akron, O.

276,217. **Parkwood Clothes.** Men's wearing apparel including raincoats. B. Kaplan & Co., New York, N. Y.

276,259. Words: **"Homeward Bound"** on an obtuse angle. Golf balls. Gimbel Bros., Inc., New York, N. Y.

276,273. **Dentlets.** Chewing gum. American Chicle Co., Long Island City, N. Y.

276,290. **Knight.** Golf balls. Endicott Johnson Corp., Endicott, N. Y.

276,299. Fanciful design, representation of a knight's head, and the words: **"Paracord Black Knight."** Golf balls. Endicott Johnson Corp., Endicott.

276,349. **Longlife.** Druggists' sundries. Seiberling Latex Products Co., Akron, O.

276,350. **Sturdy.** Druggists' sundries. Seiberling Latex Products Co., Akron, O.

276,352. **Nonscor.** Automobile brake band lining. Union Asbestos & Rubber Co., Chicago, Ill.

276,360. **Modell's.** Tennis balls, golf balls, etc. H. Modell, doing business as Modell's, New York, N. Y.

276,371. **Astoria.** Automobile inner tubes. Crescent Auto Supply Co., Jamaica, N. Y.

"RUBBER WINDOW CHANNELS," extremely informative article of interest to builders of automobile bodies, is concluded in this issue.

Dominion of Canada

50,378. Representation of a maple leaf. Erasers, etc. Eagle Pencil Co., New York, N. Y., U. S. A.

50,438. Broken circle in the center of which appear the letters: **"GP,"** inside and around the edge of the broken circle the words: **"Gutta Percha & Rubber"** and depending from the broken circle an arc of a larger circle with two radial end walls connected with the broken circle and the word: **"Limited."** Footwear, mechanical goods, tires, tubes, etc. Gutta Percha & Rubber, Ltd., Toronto, Ont.

50,491. **Hydro.** Brake and clutch linings. Raybestos-Manhattan, Inc., Bridgeport, Conn., U. S. A.

50,533. **Inches Off.** Elastic webbing, etc. Associated Apparel Industries, Inc., Chicago, Ill., U. S. A.

50,576. **Roldak.** Brake linings. Russell Mfg. Co., Middletown, Conn., U. S. A.

50,578. Representation of an ace of spades containing the word: **"Ace."** Hard or soft rubber products. American Hard Rubber Co., New York, N. Y., U. S. A.

50,593. **Argus.** Tennis balls, quoits, golf balls, and play balls. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

United Kingdom

509,241. **Nimrod.** Footwear. Naamlooze Vennootschap Vereenigde Nederlandsche Rubberfabrieken, Heveadorp, Holland.

514,576. **Spenate.** Composition of vulcanized rubber and cellulose, for use as a substitute for wood. Spen Rubber Works, Ltd., Yorkshire.

515,413. **Exten.** Soles, heels, and tips for boots and shoes. Redfern's Rubber Works, Ltd., Hyde, near Manchester.

Designs

United States

82,078. **Atomizer.** Term 7 years. P. B. Brown, assignor to De Vilbiss Co., both of Toledo, O.

82,254. **Tire.** Term 14 years. C. J. Dolding, assignor to Morgan & Wright, both of Detroit, Mich.

82,255. **Tube.** Term 7 years. E. J. Elting, Chicago, Ill.

82,274. **Atomizer.** Term 14 years. H. K. Mulford, assignor to National Drug Co., both of Philadelphia, Pa.

82,296. **Overshoe.** Term 14 years. G. L. Van Dinter, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

Dominion of Canada

8,873 and 8,874. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

8,875. **Boot.** Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., U. S. A.

8,878, 8,879, 8,880, 8,881. **Ball.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

8,900. **Soles.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

MARKET REVIEWS

Crude Rubber

New York Exchange

THE prime reason for the depression in rubber prices, of course, is overproduction. All constructive efforts have been aimed at either reducing production or increasing consumption.

At present there is a slight indication that progress is being made in both these directions. It must be understood, however, that although a little improvement is in evidence, it will have to assume much larger proportions before it will have much influence on the price of rubber. Not much can be expected for the present year in any case, because the rubber now in sight will exceed by a large margin the most sanguine estimates of consumption for November and December.

More and more native producers are feeling the pinch of the low prices that have prevailed for so long in rubber. Reports from the Far East indicate that a number of the smaller native growers have been forced to abandon a portion of their estates, or else turn from growing rubber to growing rice. If this change continues, the year 1931 should see a much more healthy ratio between consumption and production of rubber.

On the side of consumption, the favorable news comes from tire and automobile manufacturers. With new automobile models being presented to the public from 30 to 40 days in advance of the regular dates, manufacturers are increasing production in many plants. It remains to be seen, though, whether the public is going to unfasten the purse strings on its hoarded capital to maintain this increased schedule.

Tire manufacturers are also making predictions of better business in the next few months, basing their prognostications on the facts that while gasoline consumption has increased, almost 20,000,000 less tires will have been sold during 1930 than during 1929.

If these two developments can be sustained, the rubber market will undoubtedly find itself in a much improved condition before 1931 is very old.

Week ended November 1. Prices followed a highly irregular course during this week, with a day of quiet trading followed by one of unusual activity and a sharply higher level of prices. On Wednesday the Rubber Exchange witnessed a record sales turnover. The day's sales totaled 2,210 long tons on the new No. 1 Standard contract, compared with 1,400 tons, the best previous record established on September 8 last.

RUBBER BULL POINTS

1. Automobile trade gained.
2. Tire inventories are low.
3. Conferences by Dutch rubber growers to discuss situation of industry were renewed.
4. Ceylon shipments of crude rubber during October totaled 7,605 tons, a drop of 273 tons from the September shipments of 7,878 tons.
5. Dealers' stocks in the Far East at October 31 totaled 35,196 tons, a drop of 1,989 tons from September holdings.
6. Harbor stocks at Singapore and Penang totaled 4,734 tons on October 31, as compared with 6,830 tons at the close of the previous month.
7. October consumption was 27,271 tons, compared with 25,238 tons in September and 24,455 tons in October last year.
8. Scarcity of soft grades of rubber has stimulated demand for remilled grades.
9. Higher consumption is forecasted for November and December.
10. Estimates indicate lower shipments from Malaya in November.

RUBBER BEAR POINTS

1. Manufacturers are well supplied with rubber.
2. Large stocks are on hand in London and Liverpool.
3. Arrivals for October were 43,725 tons; while consumption was only 27,271 tons.
4. Stocks on hand at October 31 were 184,701 tons.
5. Tire sales for 1930, as compared with 1929, were drastically lower.
6. World consumption of rubber will be far short of production in 1930.

In addition, there were sales of 470 long tons in the old contract. New May and July were the most active months. After selling at a high of 9.85 cents during the first hour, the market reacted to 9.75 cents on trade selling. But the advance was resumed during the afternoon, and the market closed at the day's best prices, or at gains ranging up to 50 points.

Firmness was helped by the announcement that a readjustment has been made in tire prices by the larger manufacturing companies, by which a more uniform discount is given to dealers and a retail list price is set on some sizes, that is, from 2½ to 5 per cent higher. The readjustment, it is said, will mean that the dealer's net buying price will not be materially changed, although some sizes will be reduced about 2 per cent. The moderate increase in discounts was made to encourage dealers in anticipation of a large replacement business next year. No material effect of the entry of leading oil companies into the retail end of the industry by sales at service stations and through dealer organizations has yet been felt, it is said in the trade.

Another factor in the advance is the reported heavy buying on the Continent, particularly in France where it is expected a tariff will be imposed on all imports not from French possessions. This tariff will protect French producers but will have little effect on total production because the French possessions do not materially figure in world production.

British stocks were estimated to show a decrease of 3,400 tons, but active dealer selling and local liquidation nullified any advance which the news may have instigated, because it was believed that the prospective decrease had already been discounted. Another factor that, which some believe, has been discounted to some extent, is the long awaited replacement demand in tires. Concrete evidence of that demand, however, is not expected immediately.

Prices on No. 1 Standard contract at the close of November 1 follow:

Positions	High	Low	Close	Previous Close
Nov.	....	....	8.50	8.80
Dec.	8.95	8.85	8.61	8.85
Jan.	....	....	8.80	8.95
Feb.	....	....	8.90	9.04
Mar.	....	....	9.05/9.12	9.13/9.15
Apr.	....	....	9.13	9.19
May	9.25	9.25	9.20	9.25/9.30
June	....	....	9.30	9.35
July	9.40	9.40	9.40/9.45	9.45/9.50
Aug.	....	....	9.50	9.55
Sept.	9.63	9.60	9.60/9.65	9.65/9.70
Oct.	....	....	9.72	....
Spot	....	....	8.70	8.75

Week ended November 8. The reaction during the past week has erased some of the gain which the market showed in the substantial rally which had been bolstered by Continental buying and short covering.

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—"NO. 1 STANDARD" CONTRACTS

Positions 1930	October, 1930 27	28	29	30	31	November, 1930 1	3	4*	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	22
Oct. ...	8.46	8.60	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Nov. ...	8.56	8.68	8.95	8.90	8.80	8.50	8.28	....	8.25	8.55	8.28	8.30	8.47	8.80	9.10	8.80	9.05	9.20	9.45	9.30	9.40	9.40	9.20	9.20
Dec. ...	8.66	8.75	9.15	9.00	8.85	8.61	8.35	....	8.35	8.65	8.35	8.40	8.57	8.90	9.20	8.88	9.15	9.20	9.45	9.35	9.40	9.40	9.20	9.20
1931																								
Jan. ...	8.80	8.90	9.32	9.12	8.95	8.80	8.48	....	8.45	8.75	8.55	8.54	8.68	9.02	9.34	9.04	9.28	9.32	9.64	9.40	9.54	9.53	9.34	9.32
Feb. ...	8.93	9.05	9.41	9.22	9.04	8.90	8.61	....	8.59	8.90	8.65	8.67	8.79	9.13	9.47	9.19	9.40	9.44	9.72	9.48	9.67	9.65	9.48	9.41
Mar. ...	9.06	9.20	9.50	9.35	9.13	9.05	8.74	....	8.73	9.05	8.75	8.80	8.90	9.25	9.60	9.34	9.52	9.55	9.80	9.55	9.80	9.78	9.62	9.55
Apr. ...	9.13	9.25	9.58	9.43	9.19	9.13	8.82	....	8.83	9.15	8.83	8.90	9.00	9.35	9.66	9.41	9.61	9.63	9.91	9.65	9.89	9.87	9.71	9.65
May ...	9.15	9.30	9.65	9.50	9.25	9.20	8.90	....	8.92	9.25	8.90	9.00	9.10	9.45	9.72	9.50	9.70	9.70	10.02	9.75	9.97	9.95	9.80	9.75
June ...	9.25	9.40	9.75	9.60	9.35	9.30	9.00	....	9.00	9.33	9.01	9.08	9.19	9.55	9.84	9.57	9.78	9.80	10.10	9.81	10.09	10.05	9.90	9.85
July ...	9.35	9.49	9.85	9.70	9.45	9.40	9.10	....	9.08	9.40	9.12	9.15	9.27	9.65	9.95	9.65	9.86	9.90	10.20	9.92	10.20	10.15	10.00	9.95
Aug. ...	9.47	9.60	9.92	9.83	9.55	9.50	9.23	....	9.19	9.50	9.24	9.25	9.39	9.75	10.05	9.79	9.96	10.03	10.33	10.06	10.30	10.25	10.10	10.05
Sept. ...	9.60	9.70	10.10	9.95	9.65	9.60	9.35	....	9.30	9.60	9.36	9.35	9.51	9.85	10.15	9.90	10.05	10.15	10.45	10.21	10.40	10.35	10.20	10.15
Oct. ...	....	....	....	....	....	9.72	9.48	....	9.42	9.70	9.50	9.50	9.62	10.00	10.25	10.00	10.20	10.30	10.60	10.40	10.50	10.45	10.30	10.30

* Holiday.

But traders were looking for some such behavior on the part of crude rubber prices. It will be recalled that in describing the reactions of traders to the substantial advance in prices, we reported that the majority opinion looked on the rise as only temporary, with no constructive action on the bullish side expected until next year.

The decrease in Malayan output for October was lower than expected, and announced as it was before the holiday, the market dropped from 20 to 30 points. Prices rallied on Thursday under dealer support and commission house buying, but dropped back the next day and closed the week at about those levels.

The decrease which was shown in October shipments of crude rubber from Malaya was 759 tons from the September shipments of 48,529 tons, or a total of 47,770 tons for October. A total of 24,999 tons of the October shipments was consigned to the United States, against shipments of 26,644 tons to this country from Malaya in the preceding month. Malayan imports of crude rubber last month were 7,312 tons, against 8,107 tons in September.

At Youngstown, O., the midwestern steel and iron market was stimulated by reports of improved operations of automobile companies in the Detroit district. This increase will mean enlarged requirements for flat-rolled steel, running to strips and sheets in particular. As inventories in control of the automobile builders are low, rush shipments from valley steel plants to the automobile industry are frequent, it was reported.

Another report from Detroit indicates that one leading automobile plant will have recalled 3,500 workmen within the next two weeks, 1,000 returning to work last week. This recall, the report says, is the result of new models to be offered to the public before the end of the current month.

British stocks are expected to show another decrease, probably amounting to about 1,600 tons. Prices in London, however, were dull and showed little change for the latter part of the week.

RUBBER EXCHANGE ACTIVITIES

Transactions

Week Ended	Contracts Sold: Number	Contracts Sold: Tons	Transferable Notices	Week-End Tone
Nov. 1	1,373	3,432.5	73	Quiet
Nov. 8	704	1,760.0	1	Steady
Nov. 15	1,113	2,782.5	0	Steady
Nov. 22	1,278	3,195.0	21	Steady
Totals	4,468	11,170.0	95*	

*Deliveries of actual rubber.

Prices at the close of November 8 on No. 1 Standard contract were:

Positions	High	Low	Close	Previous Close
Nov.	....	....	8.30	8.28
Dec.	8.42	8.42	8.40/8 45	8.35
Jan.	....	....	8.54	8.55
Feb.	....	....	8.67	8.65
Mar.	....	....	8.80	8.75
Apr.	....	....	8.90	8.83
May	9.02	8.96	9.00	8.90
June	....	....	9.08	9.01
July	9.15	9.15	9.15/9.20	9.12
Aug.	....	....	9.25	9.24
Sept.	....	....	9.35	9.36
Oct.	....	....	9.50	9.50
Spot	....	....	8.37	8.43

Week ended November 15. The market staged strong rallies on Wednesday, and for the last two days of the week, both taking prices to 9 cents, which is a high point for the present movement. The strength in the crude rubber markets both here and in London on Wednesday resulted from a report originating in London that the Dutch rubber growers have called a meeting for November 17 to discuss the situation now prevailing in the industry.

Numerous efforts have been made by Dutch and British rubber interests during the past few months to develop a restriction plan that would tend to curb present world overproduction and restore prices to a profitable basis, but thus far relatively little success has attended these efforts. Notwithstanding the failure of rubber interests thus far to agree on a general restriction plan, however, a number of the large companies in the Far East have already sharply curtailed their output of rubber.

Restricted production is undoubtedly becoming a strong factor in the market, and it is being effected not only by the large companies but also by the natives. Ceylon shipments of crude rubber during October totaled 7,605 tons, a drop of 273 tons from the September shipments of 7,878 tons; and shipments to the United States from Ceylon last month were 4,759 tons, as compared with 4,942 tons in the previous month. Another report shows that dealers' stocks of crude rubber held in the Far East continued to decline during October, with the total on October 31 being 35,196 tons, a drop of 1,989 tons from September 30 holdings and 7,059 tons under the total for August 31.

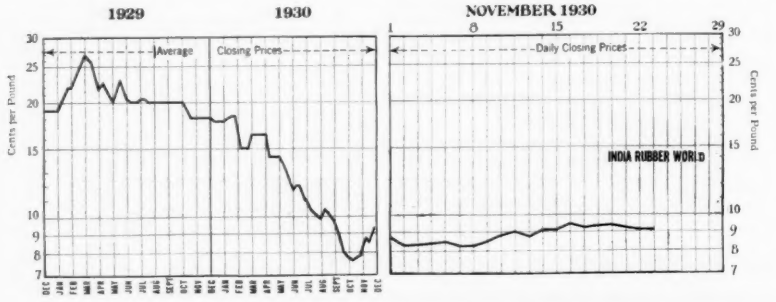
The week-end advance was stimulated by these reports of diminished offerings from the East, but more especially on account of the October consumption figures, which were better than looked for. October consumption was placed at 27,271 tons, against 25,238 tons in September and 24,455 tons in October last year. An increase for October was not generally expected, and some observers had been looking for a disappearance last month of about 22,000 tons.

Probably under the influence of these figures, trade circles seem to be expecting better consumption figures for November and December in the United States than were originally estimated. At first it was thought that November would show about 22,000 tons, with December slightly less; now the forecasts range about 48,000 tons for the two months combined.

Prices at the close of November 15 on No. 1 Standard contract were:

Positions	High	Low	Close	Previous Close
Nov.	.....	.....	9.20	9.05
Dec.	9.23	9.20	9.20/ 9.23	9.15/ 9.20
Jan.	.....	.....	9.32	9.28
Feb.	.....	.....	9.44	9.40
Mar.	9.60	9.55	9.55/ 9.60	9.52/ 9.55
Apr.	.....	.....	9.63	9.61
May	9.80	9.80	9.70/ 9.75	9.70/ 9.75
June	.....	.....	9.80	9.78
July	10.00	9.99	9.90	9.86/ 9.89
Aug.	.....	.....	10.03	9.96
Sept.	10.29	10.20	10.15/10.20	10.05/10.15
Oct.	10.40	10.40	10.30/10.38	10.20
Spot	.....	.....	9.35	9.10

Week ended November 22. In an irregular market, prices advanced and retarded in a narrow range, with prices at the end of the week showing almost the same as those at the end of the previous week.



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	October, 1930					November, 1930																
	27	28	29	30	31	1	3	4*	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	22
Ribbed Smoked Sheet	8 5/8	8 3/4	9	8 7/8	8 3/4	8 3/4	8 1/4	...	8 3/8	8 5/8	8 1/4	8 1/4	8 1/2	8 7/8	9	8 3/4	9 1/8	9 1/8	9 1/2	9 1/4	9 3/8	9 3/8	9 1/4	9 1/8
No. 1 Thin Latex Crepe	8 7/8	9	9 3/8	9 1/4	9 1/8	9	8 5/8	...	8 5/8	9	8 5/8	8 5/8	8 7/8	9 1/8	9 3/8	9 1/4	9 3/8	9 3/8	9 1/2	9 3/4	9 5/8	9 5/8	9 5/8	9 3/8
No. 1 Thick Latex Crepe	8 5/8	8 3/4	9	8 7/8	8 7/8	8 3/4	8 1/4	...	8 3/8	8 5/8	8 1/4	8 1/4	8 1/2	8 7/8	9	8 7/8	9 1/8	9 1/4	9 1/2	9 3/8	9 3/8	9 3/8	9 3/8	9 1/8
No. 1 Brown Crepe	8 1/8	8 1/4	8 3/8	8 3/8	8 1/4	8 1/4	7 7/8	...	8	8 1/8	8	8	8	8 3/8	8 1/2	8 1/2	8 3/8	8 1/2	8 7/8	8 7/8	8 7/8	9	8 3/4	8 3/4
No. 2 Brown Crepe	7 7/8	8 1/8	8 1/4	8 1/8	8	8	7 1/2	...	7 5/8	7 7/8	7 3/4	7 3/4	7 5/8	8 3/8	8 1/8	8 1/8	8 1/8	8 1/4	8 5/8	8 5/8	8 5/8	8 3/4	8 1/2	8 1/2
No. 2 Amber	8 1/8	8 1/4	8 1/2	8 3/8	8 1/4	8 1/4	7 7/8	...	8	8 1/8	8	8	8	8 3/8	8 1/2	8 1/2	8 1/2	8 1/2	8 7/8	8 7/8	8 7/8	9	8 3/4	8 3/4
No. 3 Amber	8	8 1/8	8 3/8	8 1/4	8 1/8	8 1/8	7 5/8	...	7 3/4	7 7/8	7 3/4	7 3/4	7 3/4	8 1/8	8 1/4	8 1/4	8 3/8	8 1/4	8 3/4	8 5/8	8 5/8	8 7/8	8 1/4	8 1/4
No. 4 Amber	7 1/2	7 5/8	7 3/4	7 3/4	7 5/8	7 5/8	--	...	7 1/2	7 1/2	7 3/8	7 3/8	7 3/4	7 3/4	7 3/4	7 3/4	7 7/8	7 7/8	8 3/8	8 1/4	8 1/4	8 3/8	8 3/8	8 1/4
Rolled Brown	7 3/8	7 1/2	7 3/4	7 5/8	7 1/2	7 1/2	7 1/4	...	7 1/4	7 3/4	7 1/4	7 1/4	7 3/8	7 3/4	7 3/4	7 1/2	7 7/8	7 3/4	8 1/2	8 1/8	8 1/8	8 1/4	8 1/8	8 1/4

*Holiday.

The meeting of the Dutch rubber growers caused both strength and weakness in the market. On Monday the market was strong, but on Wednesday it weakened when it was felt that all efforts at restriction had been abandoned. In spite of this fact, one of the most encouraging features at present is that native production in the Far East is gradually falling off.

At the above meeting, British rubber producers proposed a compact with Dutch rubber interests for setting aside at the disposal of a joint propaganda committee a portion of next year's rubber production, the rubber so segregated to be devoted to new uses with the object of stimulating consumption. It was understood that this proposal by the British was favorably received, and members of the Dutch group were given a week to consider the British plan. The Dutch committee of rubber producers, which had previously tendered its resignation, was reported to have reconsidered its decision, and plans to continue in office for the time being in an effort to work out some stabilization plan with British producers. These efforts are being closely watched.

Word from Akron, O., last week stated that uniform discounts and datings on tire deliveries to dealers were agreed upon at a conference between representatives of tire manufacturers and of the National Tire Dealers' Association. This action will insure equal treatment of all dealers in the matter of tire deliveries, especially during the spring dating period, which is now getting under way. Manufacturers anticipate a heavy tire demand for replacement during 1931, according to the opinions that were expressed during the conference.

The meeting between the rubber companies and the dealers will probably be followed by others in an effort to bring about closer cooperation between manufacturing and distributing branches of the trade. Informal discussions were also held on the establishment by some companies of their own retail dealer units. Independent dealers insist that these shall be regulated so as not to work a hardship upon them.

Rubber stocks in London and Liverpool are expected to show another slight increase for this week, and induced selling in London, which was later reflected in this market.

Prices at the close of November 22 on No. 1 Standard contract were as follows:

Positions	High	Low	Close	Previous Close
Nov	.....	.....	9.20	9.20
Dec. ...	9.20	9.20	9.20	9.20
Jan.	.....	.....	9.32	9.34
Feb.	.....	.....	9.41	9.48
Mar.	.....	.....	9.55/ 9.62	9.62/ 9.65
Apr.	.....	.....	9.65	9.71
May	.....	.....	9.75/ 9.78	9.80/ 9.85
June	.....	.....	9.85	9.90
July ...	9.95	9.95	9.95	10.00
Aug.	.....	.....	10.05	10.10
Sept. ...	10.20	10.15	10.15/10.18	10.20/10.24
Oct.	.....	.....	10.30	10.30
Spot	.....	.....	9.20	9.25

The market on November 21 opened steady at 9.24 cents for December position but soon dropped to 9.20 cents. The current market movement is attributable to speculative interest and short covering.

N. Y. Outside Market

The movement that carried rubber prices over nine cents has been sustained for several weeks, and traders are wondering whether the improvement is temporary or permanent.

In this respect it is pointed out that the present level of prices has not seen any sizable amount of buying from factory interests. They are well stocked with rubber at lower prices and can afford to wait for a turn in the market. This reluctance of the factory buyers to come into the market may be considered as a favorable development so far as the long term trend of prices is concerned.

If crude rubber can be held at or near its present levels, the prospect of a continued curtailment in native production might safely be expected to extend well into 1931. But if prices improve in the near future, there is an equal prospect of natives resuming production on an increased scale.

The statistical figures for October on the whole were bullish. Production declined in the Far East; stocks on hand decreased; and consumption here was larger than expected. Forecasts for November indicate continued improvement. The only unwelcome news comes from London and Liverpool, where stocks are again showing slight increases after declining for several weeks.

Automobile manufacturers are not only expecting an upturn in sales, but they report that stocks in dealers' hands are extremely low, with reports crediting distributers with from one to three cars on an average in their salesrooms. Both the

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and Nov. 24, the current date

Plantation Hevea	November 26, 1929	October 25, 1930	November 24, 1930
Rubber latex (Hevea)...*gal.*	$1.40 @	$0.75 @$0.90	$0.75 @
Sheet			
Ribbed, smoked, spot	.16 @.16¼	.08⅞ @	.09¼ @.09⅜
November	.16⅛ @	.08⅞ @	.09¼ @
November-December	.16¼ @	.09 @.09⅛	.09⅜ @.09½
January-March	.17 @.17¼	.09⅜ @	.09½ @.09¾
April-June	.17½ @.17¾	.09⅝ @	.09¾ @.10⅜
CREPE			
No. 1 Thin latex (first latex) spot	.17 @	.09¼ @.09⅜	.09¾ @.10
November	.17 @	.09⅜ @	.09⅞ @
November-December	.17¼ @	.09½ @	.09⅞ @.10
January-March	.17½ @.18	.09¾ @.09⅞	.10¼ @.10⅜
April-June	.18½ @.18¾	.10⅛ @	.10½ @.10¾
No. 2 Amber, spot ("B" blanket)	.14¼ @.14½	.08 @	.08⅞ @.09
November	.14¼ @.14½	.08⅛ @	.08⅞ @
November-December	.14½ @.14¾	.08¼ @	.08⅞ @.09
January-March	.14½ @.15	.08⅜ @	@
April-June	.15 @.15½	.08½ @	@
No. 3 Amber, spot ("C" blanket)	.13⅞ @.14	.07¾ @	.08½ @.08¾
No. 1 Brown, clean, light, thin	.14¼ @.14½	.07⅞ @.08	.08¾ @
No. 2 Brown, clean, thin	.13⅞ @.14	.07⅝ @.07¾	.08½ @.08¾
Brown, roll	.10¼ @.10½	.07½ @	.08¼ @.08½
East Indian			
PONTIANAK			
Banjermasin	.06 @.08	.07 @	.06 @
Pressed block	.13 @.14	.12 @	.12 @
Sarawak	.09 @	.07 @	.06 @
South American			
PARAS			
Upriver, fine	.16 @	.12¼ @	.12¾ @
Upriver, fine	*.23½ @	*.15 @	*.15½ @
Upriver, coarse	.08¼ @	.08 @	.08¾ @
Upriver, coarse	*.15 @	*.10½ @	*.10½ @

South American	November 26, 1929	October 25, 1930	November 24, 1930
PARAS—*Continued*			
Islands, fine	$0.14¾ @	$0.11¼ @	$0.12 @
Islands, fine	*.23 @	*.14½ @	*.15 @
Acre, Bolivian, fine	.16½ @	.12½ @	.13 @
Acre, Bolivian, fine	*.24 @	*.15 @	*.16 @
Beni, Bolivian	.16¾ @	.12¾ @	.13⅛ @
Madeira, fine	.16 @	.12¼ @	.12¾ @
CAUCHO			
Upper caucho ball	.08¼ @	.07¾ @	.07¾ @
Upper caucho ball	*.15 @	*.10½ @	*.10½ @
Lower caucho ball	.07¼ @	.07¼ @	.07 @
Manicobas			
Ceará negro heads	†.20 @	@	@
Ceará scrap	†.12 @	@	@
Manicoba, 30% guaranteed	†.22 @	@	@
Mangabiera, thin sheet	†.22 @	@	@
Guayule			
Duro, washed and dried	.17 @	.15 @	.15 @
Ampar	.18 @	.16 @	.16 @
Gutta Percha			
Gutta Siak	.17½ @.18½	.12½ @	.13½ @
Gutta Soh	.28 @	.25 @	.29 @
Red Macassar	2.50 @	1.75 @	@
Balata			
Block, Ciudad Bolivar	.40 @.42	.34 @	.32 @
Colombia	.38 @.40	.34 @	.32 @
Manaos block	†.50 @	.38 @	.37 @
Surinam sheet	.51 @.53	.58 @	.57 @
Amber	.53 @.55	.63 @	.60 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal.

cotton and the rubber industries are expecting to benefit by the expected large demand for replacement tires in 1931. It is not merely that tires last longer, but the fact that people are running their tires to the fabric before purchasing new ones is responsible for the large drop in the sale of tires for 1930 as compared with 1929. This condition is soon to be rectified, is the general opinion.

Week ended November 1. French buying was credited with being back of the record day's trading on Wednesday. It is expected that a large import duty will be imposed on all rubber imported into France that is not from one of its possessions, and purchases were made in anticipation of such a tariff.

Outside of this activity on the upside, the market was quiet and irregular in its price swings, closing the week at about where it started. Manufacturing interests were credited with being the leading sellers early in the week, taking advantage of the high prices carried over from the previous week.

Prices at London and Singapore were fairly steady, and several times led the advance on this market although these rises were not long maintained over here. Stocks at London and Liverpool are expected to show a large decrease on Monday, but dealers and traders already seem to have discounted that fact.

A good deal of speculative buying was seen after the information was received that leading tire manufacturers had increased tire prices from 2½ to 5 per cent, effective November 1. Prices at the close on November 1 were:

Spot	Nov. 1	Month Ago	Year Ago
Crepe	9	7⅝	18¾
Ribs	8¼	7⅜	17¾
Upriver fine....	12½	12	19¼

Week ended November 8. Although trading was quiet in this market, prices were firm. Good support was in evidence on the declines which made for a steady undertone. Prices in some grades of rubber were on a par with, and a little higher than, prices in New York. This level is due, of course, to the elimination of the soft grades of rubber and the consequent heavier demand on the ribbed grades.

The Continental buying, which had been partly responsible for the recent rally, subsided although this buying served to reduce stocks at London and Liverpool approximately 5,500 tons in the last three weeks.

Production in Malaya declined again during October, but not to the extent expected. Shipments from there in October were 47,770 tons, a decrease of only 759 tons from the September shipments. The native estates do not have the financial backing accredited to the European owned estates, so that if rubber prices do not move a great deal from present levels, traders look for lower and lower shipments from natives, because of the unprofitable return at these levels. Imports into Malaya during October were 7,312 tons, which compares with 8,107 tons in September and 12,516 tons in October, 1929. Prices at the close on November 8 were:

Spot	Nov. 8	Month Ago	Year Ago
Crepe	8⅝	8⅛	17⅝
Ribs	8¼	7⅞	16⅝
Upriver fine....	12¼	12	17¼

Week ended November 15. With firmer prices a small amount of factory buying was noted in the distant futures. Increased consumption figures for October and small reductions in output served to give the market the support needed for sending prices higher. October consumption had been estimated at 22,000 tons; but when the figure was reported as 5,271 tons higher, the market recovered 20 to 30 points.

The Dutch rubber growers are going to meet again on Monday to discuss the situation. In spite of the many meetings which they already have had with no consequences, this latest announcement served to send the market 20 to 30 points higher.

With an important manufacturer in the low-priced field bringing out a new model and with the hope that several others will follow suit, automobile output is expected to be much stronger for the next few weeks. The real test, however, will come when it is known how sales have been affected by the new offerings.

The recent optimistic forecasts by tire manufacturers have been induced to a large extent by the fact that tire inventories have continued their steady decline. After the first of the year a strong market for tires is looked for, through which manufacturers should be able to reduce the large stocks of rubber on hand. The shoe industry is also reported as showing signs of improvement, and the holidays will undoubtedly stimulate the trade of a number of small manufacturers.

Whether the pleasant picture of increased consumption and reduced production will continue it is hard to say, but promulgators are already increasing their estimates of November and December consumption. Prices at the close on November 15 were:

Spot	Nov. 15	Month Ago	Year Ago
Crepe	9⅜	8¼	17⅞
Ribs	9⅛	7⅞	17
Upriver fine....	12½	12	16¾

Week ended November 22. With factories well stocked with rubber, there was no inducement for them to buy in last week's market. Prices stayed above 9 cents, with only slight fluctuations. There is, however, a strong demand for remilled grades because of the scarcity of ambers and softer grades.

Tire inventories are low, and manufacturers are predicting a strong replacement demand as soon as the year turns. In addition automobile manufacturers are looking forward to increased demand in the next few weeks in response to new models which in many cases are being placed on display a month earlier this year. The two large manufacturers have already brought out new designs; a complete new line on the part of one, and a new model added to the groups of the other. During the last two weeks more than 6,000 men were recalled to various automobile factories.

Another important fact is that the number of cars in the hands of dealers is extremely small. One of the largest of the small-car producers reports its dealers as having an average of less than three cars, and one of the largest of the medium-priced manufacturers reports an average of little more than one car a dealer.

Native production shows signs of reduction; and if the present trend is continued, a decided improvement can be expected next year. Prices at the close on November 22 were:

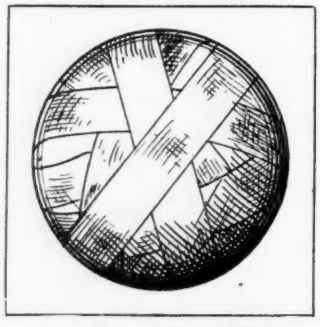
Spot	Nov. 22	Month Ago	Year Ago
Crepe	9⅝	8¼	16⅞
Ribs	9⅛	8	16
Upriver fine....	12½	12	16¾

On November 24, spot ribbed rubber was available at 9⅜ cents with very little interest on the part of factories to purchase for other than their immediate needs.

Packaging Tennis Balls

EXTREME care is taken in the manufacture of tennis balls to meet certain established requirements relating to size and rebound. Notwithstanding the precautions taken, material changes frequently occur in the balls during the period between their manufacture and use. Therefore, at the time the balls are put in play they do not conform to the established requirements, and their wall structure is seriously affected.

This condition is due primarily to the expansion of the ball by the pressure of the internal inflation medium. An invention[1] designed to prevent this defect, provides winding the ball with a tape or cloth, paper, or analogous material as indicated in the illustration. The winding is applied under sufficient tension so that when the ball is completely covered, it will be held at reduced size, and the tension on its wall be relieved. The tape is removed or unwound when the ball is to be used in play.



Tape Wound Tennis Ball

[1] U. S. Patent No. 1,752,695, Apr. 1, 1930.

IT IS ESTIMATED THAT AN EMPLOYE WILL lose 30 days due to his receiving a fracture of his first toe left foot. The fracture was the result of a hose pole slipping from a table striking his foot. *National Safety News.*

Rubber Scrap

THE compounding value and the demand for reclaims, rather than the price of crude rubber, are the price controlling factors for rubber scrap. Reclaim and crude rubber values are virtually independent.

The scrap rubber market activity was somewhat better in November than in October owing to the upward movement of crude rubber, although generally the demand for scrap was rather light. Two price reductions are noted in the quotations reported below. They are in No. 1 inner tubes and air brake hose. The only grade to advance is mixed auto tires with beads.

BOOTS AND SHOES. Demand for boot and shoe scrap shows some improvement over that of a month ago. Collectors continue to refuse to separate black from colored scrap in this grade because the price margin does not justify the expense involved. Prices are steady and unchanged.

INNER TUBES. Domestic demand for inner tubes is reported good, particularly in No. 1 for export. The entire list of grades is quoted unchanged.

TIRES. While the market for tire scrap is fair, prices are so low that dealers have no incentive for seeking to enlarge their stocks, and scrap tires remain scattered where discarded. Prices are quoted unchanged except for mixed tires with beads, which are quoted at $16, up $1 per ton from the October prices.

MECHANICALS. Mechanical grades of all qualities are dull, but prices are quoted firm and unchanged except air brake hose quoted at $13.50, down from $14.

HARD RUBBER. Trade is dull. No. 1 quality is in moderate demand for the preparation of hard rubber dust at prices the same as quoted one month ago.

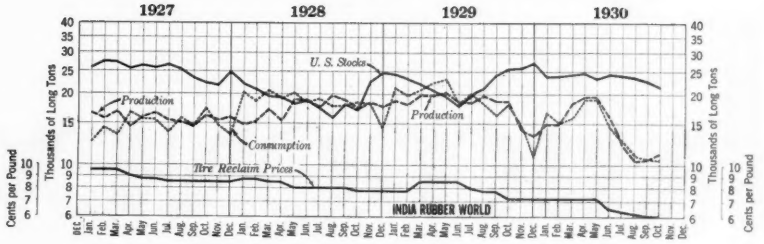
CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

November 24, 1930

	Prices
Boots and Shoes	
Boots and shoes, black..100 lb.	$1.10 @ $1.15
Untrimmed arctics....100 lb.	.70 @ .80
Tennis shoes and soles..100 lb.	.60 @ .70
Inner Tubes	
No. 1, floating.....lb.	.05 @ .05¼
No. 2, compound.....lb.	.02½ @ .02¾
Red .....lb.	.02¾ @ .02½
Mixed tubes.....lb.	.02¼ @ .02⅜
Tires	
Pneumatic Standard	
Mixed auto tires with beads .....ton	11.50 @ 12.00
Beadless .....ton	16.00 @ 16.50
Auto tire carcass.....ton	17.00 @ 17.50
Black auto peelings....ton	20.00 @ 21.00
Solid	
Clean mixed truck....ton	24.50 @ 25.50
Light gravity.....ton	29.00 @ 30.00
Mechanicals	
Mixed black scrap.....lb.	.00¾ @ .01
Hose, air brake.....ton	13.50 @ 14.00
Garden, rubber covered..lb.	.00¾ @ .00½
Steam and water, soft..lb.	.00⅜ @ .00½
No. 1 red.....lb.	.02 @ .02¼
No. 2 red.....lb.	.01 @ .01½
White druggists' sundries..lb.	.02 @ .02½
Mechanical .....lb.	.01½ @ .01¾
Hard Rubber	
No. 1 hard rubber.....lb.	.10 @ .10¼



Production, Consumption, Stocks, and Prices of Tire Reclaim

Reclaimed Rubber

MANUFACTURERS of reclaim have for a full year adjusted their production to balance very closely with consumption. Consequently stocks on hand from January to October inclusive showed a monthly average of 23,822 tons. This average was closely maintained up to September when stocks fell off sharply with consumption and did the same in October.

Reclaimers are operating their plants steadily at a moderate pace, maintaining practically full force. Reclaim has survived the acid test imposed by the long continued low prices of crude rubber, and in that period has demonstrated as never before its value as a compounding ingredient.

Research by reclaimers has kept pace with similar work on the part of rubber goods manufacturers so that reclaims are now characterized by quality, utility, workability in processing, power cost saving in mixing, and advantageous volume costs.

It is notable that the ratio of the consumption of reclaim to crude rubber is holding close to 40 per cent and even exceeded that ratio by 1.4 per cent in September. Although October consumption ratio fell to 39.3 per cent, it was 3.4 per cent above that in August, which showed the lowest monthly ratio so far this year. The successful maintenance of the reclaim consumption ratio speaks convincingly of the utility, economy, and standard qualities of the product.

In the standard list below few and very minor changes have been made in quotations reported in November. These changes are confined to the high tensile and tube grades and amount only to recessions of ¼-cent a pound.

New York Quotations

November 24, 1930

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black...	1.20	$0.08¼ @ $0.08½
red	1.20	.08 @ .08¼
Auto Tire		
Black	1.21	.05¾ @ .06
Black selected tires....	1.18	.06 @ .06½
Dark gray	1.35	.07 @ .07½
White	1.40	.08½ @ .08¾
Shoe		
Unwashed	1.60	.06 @ .06¼
Washed	1.50	.07¾ @ .08
Tube		
No. 1	1.00	.08¼ @ .08½
No. 2	1.10	.07¼ @ .07½
Truck Tire		
Truck tire, heavy gravity	1.55	.06 @ .06¼
Truck tire, light gravity	1.40	.06¼ @ .06½
Miscellaneous		
Mechanical blends.....	1.60	.05 @ .05½

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1929					
January	18,685	21,068	49.1	24,394	941
February	18,094	19,829	47.7	23,305	1,028
March	19,984	20,068	46.7	22,076	1,344
April	19,899	21,574	47.3	20,680	1,498
May	20,385	23,176	47.1	19,479	1,299
June	18,416	18,141	42.0	17,980	961
July	18,387	20,236	48.7	19,679	1,202
August	19,787	18,230	47.6	22,309	860
September	18,660	16,416	47.2	24,984	657
October	18,968	18,024	51.8	25,474	830
November	14,363	14,742	53.4	26,080	1,232
December	13,429	11,089	47.1	27,464	869
1930					
January	15,010	16,785	45.8	24,241	954
February	15,847	14,918	45.5	24,241	1,203
March	17,400	15,616	43.2	24,415	1,048
April	17,828	17,321	43.0	24,592	740
May	17,812	17,473	43.7	23,356	939
June	15,745	14,410	41.6	24,484	641
July	12,320	12,688	42.3	23,870	778
August	10,361	10,999	35.9	23,610	807
September	10,460	10,480	41.4	22,593	656
October	11,298	10,724	39.3	21,729	†

* Stocks on hand the last of the month or year.
† Not available.
Compiled by Rubber Manufacturers Association, Inc.

MICRONEX

for a Decade.....

The rubber laboratory service of the Binney & Smith Co. began in November 1920.

During the intervening decade this service has handled hundreds of problems of varied types.

One of the most important of these was that of quality control. For ten years the quality of MICRONEX has been evaluated by rubber laboratory tests.

This development has inevitably led to imitators who have sought short cut tests for quality.

However, ten years of rubber testing have brought to MICRONEX a leadership which has now become world-wide.

BINNEY & SMITH CO.

41 East 42nd Street, New York, N. Y.

Compounding Ingredients

THE general manufacturing situation in tires in point of production is rather flat. Output in the Akron district averages from 50 to 60 per cent of capacity.

In mechanical goods and druggists' sundries production may be classed as good. Footwear and clothing is rated fair; while the demand for heels and soles and insulated wire is spotty. Accordingly the demand for compounding ingredients has been only fairly active.

ACCELERATORS. From the extensive list of accelerators available the rubber compounder will find no difficulty in selecting such as will fill every special need in practice whether it be freedom from scorching in mixing, calendering, etc., speed of cure, or age resisting effect.

The latest addition to the list is Di-Esterex-N, which is a new combination accelerator with unique characteristics that adapt it for footwear, tire, inner tube, and mechanical rubber goods stocks, and other lines as well.

AGE RESISTERS. Rubber compounders are similarly favored with regard to choice of specialized age resisters, as in the case of accelerators, and will do well to note with care the particular deteriorating influence to which his goods will be subjected in service.

CARBON BLACK. In this line producers have curtailed operations from time to time in conformity with reduction of demand. Since curtailment is difficult at some points, stocks have increased. The excess, however, will prove an advantageous reserve when demand increases.

Indications are multiplying that 1931 will be a fairly good year for carbon black. Independently of automobile production tire replacement business will certainly be heavy and react to increase carbon black consumption.

The price situation has been very chaotic because production generally exceeded consumption. Prices have been weak throughout the year, and distress selling resulted on the part of certain producers without established outlets, who are unable to maintain the specification quality now demanded by the rubber trade. Standard grades of black have reached a very low price, much below the general cost of production. It is generally recognized that the situation is now fairly well stabilized and such changes as may occur will be for the better.

CLAY. This material is meeting competition from carbon black on the score of volume cost. The tonnage, in consequence, used in the rubber trade has diminished in goods other than those of white color that may require reenforcement.

LITHARGE. Price has held steady and firm. Demand is moderate and seasonal.

LITHOPONE. Rubber trade demand for lithopone is largely in the druggists' sundries and the novelties fields, which are active at the present time. Prices are firm.

SOFTENERS. This varied class of ingredients is well established not only as plasticators but as cure stabilizers in some instances. These ingredients are in steady demand, each according to the effectiveness of its special function.

V. M. P. NAPHTHA. While interest in this solvent has not been particularly keen, prices have held firm.

ZINC OXIDE. Interest in this material has fallen off in the dull conditions of tire production especially. Prices are firm and are unchanged for contracts covering the first half of 1931.

New York Quotations

November 24, 1930

Abrasives

Marble flour	ton	$20.00 @	$25.00
Pumice stone, pwd.	lb.	.02½ @	.04
Rottenstone, domestic	ton	23.50 @	28.00
Rottenstone, English	lb.	.04 @	.05
Silica	lb.	.01¼ @	.05

Accelerators, Inorganic

Lead, carbonate	lb.	.07¾ @	
red	lb.	.08¾ @	
sublimed blue	lb.	.07¾ @	
sublimed white	lb.	.07¼ @	
super-sublimed white	lb.	.07¼ @	
Lime flour, hydrated	ton	20.00 @	35.00
Litharge	lb.	.07¾ @	
Magnesia, calcined, heavy	lb.	.04 @	
carbonate	lb.	.06 @	.07
Orange mineral A.A.A.	lb.	.10¾ @	

Accelerators, Organic

A-1	lb.	.22 @	.27
A-5-10	lb.	.31 @	.36
A-7	lb.	.55 @	.65
A-11	lb.	.62 @	.75
A-16	lb.	.57 @	.65
A-19	lb.	.58 @	.75
A-32	lb.	.70 @	.75
Accelerator 49	lb.	.36 @	.41
Aldehyde ammonia	lb.	.65 @	.70
Barak	lb.	@	
B. L. E.	lb.	@	
Butene	lb.	@	
Captax	lb.	@	
Crylene	lb.	@	
paste	lb.	@	
D. B. A.	lb.	@	
D. O. T. G.	lb.	.42 @	.47
D. P. G.	lb.	.30 @	.35
Ethylidine aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½ @	.40
Heptene	lb.	@	
base	lb.	@	
Hexamethylenetetramine	lb.	.58½ @	.61
Lead oleate, No. 999	lb.	.13 @	
Witco	lb.	.15 @	
Lithex	lb.	@	
Monex	lb.	@	
Phenex	lb.	.70 @	.75
Pipsol	lb.	4.00 @	4.50
Plastone	lb.	@	
R-2	lb.	1.75 @	2.15
base	lb.	4.50 @	5.00
R & H 40	lb.	.40 @	.42½
50	lb.	.40 @	.42½
397	lb.	.75 @	.77½
Safex	lb.	@	
S-P-D-X	lb.	.70 @	.75
Super-sulphur No. 1	lb.	@	
No. 2	lb.	@	
Tensilac 39	lb.	.40 @	.42½
Thermlo F	lb.	@	
Thiocarbanilid	lb.	.26½ @	.28½
Trimene	lb.	@	
base	lb.	@	
Triphenyl guanidine	lb.	.58 @	.60
Tuads	lb.	@	
Ureka	lb.	.70 @	1.00

Accelerators, Organic *(Continued)*

V. G. B.	lb.	@	
Z. B. X.	lb.	@	
Z-88-P	lb.	$0.50 @	$0.60
Zimate	lb.	@	

Acids

Acetic 28% (bbls.)	100 lbs.	2.60 @	2.85
glacial (carboys)	100 lbs.	9.73 @	9.98
Sulphuric, 66°	ton	15.50 @	

Alkalies

Caustic soda, 76% solid	100 lbs.	2.75 @	

Antioxidants

Age-Rite, powder	lb.	@	
resin	lb.	@	
white	lb.	@	
Albasan	lb.	@	
Antox	lb.	@	
Oxynone	lb.	.68 @	.90
Resistox	lb.	.54 @	.65
Retardex	lb.	.50 @	
Stabilite	lb.	.57 @	.62
Alba	lb.	.70 @	.75
Zalba	lb.	@	

Antisun Materials

Heliozone	lb.	@	
Sunproof	lb.	@	

Binders, Fibrous

Cotton flock, dark	lb.	.09½ @	.10½
dyed	lb.	.55 @	.90
white	lb.	.11½ @	.22

Colors

BLACK

Bone	lb.	.07½ @	
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½ @	.15
Lampblack (commercial)	lb.	.07 @	.08

BLUE

Blue toners	lb.	.60 @	3.85
Huber, brilliant	lb.	3.50 @	4.00
Prussian	lb.	.35 @	.37
Ultramarine	lb.	.06 @	.30

BROWN

Huber, mocha	lb.	1.60 @	2.10
Iron oxide	lb.	.03 @	.20
Mapico	lb.	.16 @	
Sienna, Italian, raw	lb.	.05½ @	.12½

Colors *(Continued)*

GREEN

Chrome, light	lb.	$0.27 @	$0.31
medium	lb.	.28 @	.31
Chromium oxide	lb.	.25 @	.34
Green toners	lb.	1.00 @	3.60
Huber, brilliant	lb.	3.75 @	4.25

ORANGE

Cadmium sulphide	lb.	.90 @	1.00
Huber, Persian	lb.	.50 @	1.00
Orange toners	lb.	1.40 @	1.60

ORCHID

Orchid toners	lb.	1.05 @	1.70

PINK

Pink toners	lb.	1.00 @	1.80

PURPLE

Purple toners	lb.	.60 @	1.90

RED

Antimony			
Crimson, R. M. P. No. 3	lb.	.48 @	
Sulphur free	lb.	.52 @	
7-A	lb.	.35 @	
Z-2	lb.	.22 @	
Cadmium	lb.	1.15 @	1.25
Huber, brilliant	lb.	1.35 @	1.85
Iron Oxides			
bright pure domestic	lb.	.10 @	.11
bright pure English	lb.	.11 @	
bright reduced English	lb.	.08 @	
bright reduced domestic	lb.	.04 @	.08
Indian (maroon), pure domestic	lb.	.10 @	
Indian (maroon), pure English	lb.	.09¾ @	
Indian (maroon), reduced English	lb.	.08 @	
Indian (maroon), reduced domestic	lb.	.03 @	.07½
Mapico	lb.	.09 @	
Oximony	lb.	@	
Red toners	lb.	.95 @	2.75
Rub-er-red	lb.	.08¾ @	
Spanish red oxide	lb.	.02¾ @	.04
Sunburnt red	lb.	.14 @	
Venetian red	lb.	.01½ @	

WHITE

Lithopone	lb.	.05½ @	.05¾
Albalith	lb.	.05¾ @	.05½
Azolith	lb.	.05¾ @	.05¾
Cryptone	lb.	.07¼ @	.07½
Grasselli (50 lb. bags)	lb.	.05¾ @	
(400 lb. bbls.)	lb.	.05½ @	
Titanium oxide, pure	lb.	.21 @	
Titanox "B"	lb.	.07¼ @	.07¾
"C"	lb.	.07¾ @	.08½

Colors (Continued)

WHITE (Continued)

Zinc Oxide			
AAA (lead free)	lb.	$0.06½@	$0.07
Azo (factory):			
ZZZ (lead free)	lb.	.06½@	.07
ZZ (leaded)	lb.	.06¼@	.06¾
Z (8% leaded)	lb.	.06¼@	.06¾
Green seal	lb.	.10½@	.10⅝
Green seal, Anaconda	lb.	.10⅜@	.10⅝
Kadox, black label	lb.	.10¼@	.10⅜
blue label	lb.	.09¾@	.09⅝
red label	lb.	.08 @	.08¼
Red seal	lb.	.09⅛@	.09⅜
Red seal, Anaconda	lb.	.09⅛@	.09⅞
Special	lb.	.07 @	.07¼
White seal	lb.	.11⅝@	.11⅞
White seal, Anaconda	lb.	.11⅜@	.11⅞
XX green	lb.	.07 @	.07¼
XX red	lb.	.06½@	.06¾
Zinc sulphide	lb.	.16 @	.16¼

YELLOW

Cadmium sulphide	lb.	.65 @	1.40
Chrome	lb.	.16½@	
Huber, canary	lb.	2.80 @	3.30
Mapico	lb.	.12 @	
Ochre, domestic	lb.	.01½@	.02½
French	lb.	.03 @	
Oxide, pure	lb.	.09 @	
Zinc, C. P., imported	lb.	.21 @	

Factice—See Rubber Substitutes

Fillers for Pliability

Flex	lb.	@	
Fumonex	lb.	.04 @	.08
P-33	lb.	@	
Thermax	lb.	@	
Velvetex	lb.	.03 @	.06

Fillers, Ordinary

Asbestine	ton	13.40	@13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00 @	
(f.o.b. St. Louis, paper bags)	ton	22.20 @	
Barytes, white, spot	ton	30.00	@40.00
off color, spot	ton	20.00	@25.00
Foam "A" (f.o.b. St. Louis)	ton	23.00 @	
Basofor	lb.	@	
Blanc fixe, dry	lb.	.04½@	
pulp	ton	42.50	@45.00
C-C-O white (f.o.b. St. Louis, bbls.)	ton	15.00 @	
Infusorial earth	ton	45.00	@50.00
Slate flour, gray (fact'y)	ton	7.00 @	
Whiting			
Chalk, imported	100 lbs.	.95 @	1.50
Domestic	100 lbs.	1.00 @	
Paris White, English cliffstone	100 lbs.	1.50 @	3.50
Quaker	ton	@	
Sussex	ton	@	
Witco (l. c. l.) (f.o.b. New York)	ton	20.00 @	

Finishes

Mica, amber	lb.	.04 @	.05
Shellac, fine orange	lb.	.60 @	
Starch, corn, pwd.	100 lbs.	3.62 @	3.82
potato	lb.	.05½@	.06
Talc, domestic	lb.	.01¼@	
dusting	lb.	.01¼@	.04
French	ton	18.00	@22.00
Pyrax A	ton	@	

Inflating Material

Ammonium carb., pwd.	lb.	.10½@	
lump	lb.	.09½@	

New York Quotations

November 24, 1930

Mineral Rubber

Fluxrite (solid)	lb.	@	
Genasco (fact'y)	ton	$40.00	@$42.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton	@	
Hydrocarbon, hard	ton	@	
Ohmlac Kapak, M. R. (f.o.b. fact'y)	ton	60.00 @	
M. 4 (f.o.b. fact'y)	ton	175.00 @	
Paradura (fact'y)	ton	62.50	@65.00
Parmr Grade 1	ton	23.00	@28.00
Grade 2	ton	23.00	@28.00
Pioneer, M. R., solid fact'y	ton	40.00	@42.00
M. R. granulated	ton	50.00	@52.00
Robertson, M. R., solid (fact'y)	ton	34.00	@80.00
M. R. granulated	ton	38.00	@80.00

Mold Lubricants

Rusco mold paste	lb.	.12 @	.30
Soapbark (cut)	lb.	.09 @	.10
Soapstone	ton	15.60	@25.00

Oils

Kerosene	gal.	.10 @	
Mineral	gal.	.20 @	
Poppy seed oil	gal.	@	
Rapeseed	gal.	.52 @	
Red oil, distilled	lb.	.08⅝@	.09⅛
Rubber process	gal.	.25 @	
Spindle	gal.	.30 @	

Reenforcers

Aluminum flake (sacks, c. l.)	ton	21.85 @	
(sacks, l.c.l.)	ton	24.50 @	
Carbon Black			
Aerfloted arrow	lb.	.04½@	.09
Century (works, La., c. l.)	100 lbs.	4.10 @	
Disperso (works, La., c. l.)	100 lbs.	4.10 @	
Excello	lb.	.04 @	
Gastex (f. o. b. fact'y)			
contracts	lb.	.03½@	
carload	lb.	.03½@	
less carload	lb.	.05 @	.07
Micronex	lb.	.04½@	.09
Ordinary (compressed or uncompressed)	lb.	.04 @	.08
Palmer gas black	lb.	.04 @	
Supreme	lb.	.04 @	
Clays			
Bento	lb.	.02½@	.03
Blue Ridge, dark	ton	@	
China	lb.	.01¼@	
Dixie	ton	@	
Dusto	lb.	.05 @	.07
Langford	ton	@	
Lexo (works)	ton	8.00 @	
Par	ton	@	
Perfection	ton	20.00 @	
Suprex	ton	8.00	@20.00
Glue, high grade	lb.	.27 @	.35

Rubber Substitutes or Factice

Amberex	lb.	.15 @	
Black	lb.	.08 @	.12
Brown	lb.	.08 @	.13
White	lb.	.09 @	.15

Softeners

Burgundy pitch	100 lbs.	5.00 @	6.00
Atlas	100 lbs.	6.50 @	
Corn oil, crude	lb.	.09 @	
Cottonseed oil (P. S. Y.)	lb.	.09 @	
Cycline oil	lb.	.25 @	.34

Softeners (Continued)

Degras	lb.	$0.04	@$0.04½
Fluxol	ton	18.00	@80.00
Fluxrite (fluid)	lb.	@	
Palm oil (Lagos)	lb.	.07 @	
(Niger)	lb.	.06¾@	
(Witco)	lb.	.05½@	
Para-flux	gal.	.15 @	.17
Petrolatum, snow white	lb.	.08 @	.08½
Pigmentar	gal.	.18 @	.23
Pigmentaroil (tank cars, factory)	gal.	.18 @	.23
(bbls., drums)	gal.	@	
Pine oil, dest distilled	gal.	.54 @	.55
Pine pitch	bbl.	7.00 @	
Pine tar (retort)	gal.	.22 @	.25
Rosin K (bbls.) 280 lbs.		5.75 @	
Rosin oil, compounded	gal.	.35 @	
No. 3, deodorized	gal.	.57 @	
No. 556, deodorized	gal.	.48 @	
Rubberseed, drums	lb.	.09½@	.10
Rubtack	lb.	.08 @	
Tackol	lb.	.09 @	.18
Tonox	lb.	@	
Witco No. 20	gal.	.08 @	
Woburn oil	lb.	.05½@	
Wobonite No. 94	lb.	.03½@	

Solvents

Benzol (90% drums)	gal.	.26 @	
Carbon bisulphide (drums)	lb.	.05½@	.12
tetrachloride (drums)	lb.	.06¾@	.07
Dip-Sol	gal.	.11 @	
Dryolene, No. 9	gal.	.08½@	
Gasoline			
No. 303			
Drums, (c. l.)	gal.	.20 @	
Tank cars	gal.	.16 @	
Petrobenzol	gal.	.11 @	
Rub-Sol	gal.	.07 @	
Solvent naphtha (tanks)	gal.	.25 @	
Stod-Sol	gal.	.07¾@	
Toluoil	gal.	.11 @	
Turpentine, Venice	lb.	.20 @	
dest distilled	gal.	.35 @	

Stabilizers

Laurex, ton lots	lb.	@	
Stearates			
Aluminum	lb.	.26 @	.27
Calcium	lb.	.26 @	.27
Magnesium	lb.	.28 @	.29
Zinc	lb.	.27 @	.28
Stearex	lb.	.11 @	.15
Stearic acid, dbl. press.	lb.	.16 @	.18

Vulcanizing Ingredients

Sulphur			
Rubber sulphur	100 lbs.	1.75 @	2.25
Soft rubber (c.l.)	100 lbs.	@	
(l.c.l.)	100 lbs.	@	
Sulphur chloride	lb.	.06 @	
Superfine commercial flour (bbls.)	100 lbs.	2.55 @	3.10
(bags)	100 lbs.	2.20 @	2.80
Tire brand, superfine	100 lbs.	1.75 @	
Tube brand, velvet	100 lbs.	2.30 @	
Velvet flour (240 lb. bbls.)	100 lbs.	2.95 @	3.50
(150 lb. bags)	100 lbs.	2.60 @	3.15
Vandex	lb.	@	
(See also Colors—Antimony)			

Waxes

Beeswax, white, commercial	lb.	.55 @	
carnauba	lb.	.33 @	
ceresin, white	lb.	.12½@	
montan	lb.	.06½@	
ozokerite, black	lb.	.28 @	
green	lb.	.28 @	
Paraffin			
122/124, crude, white scale	lb.	.03¼@	
124/126 crude, white scale	lb.	.03¼@	
125/127 fully refined	lb.	.04¼@	

Miscellaneous Supplies

Bentonite (dispersion clay)	lb.	.02½@	.03
Sponge paste	lb.	.30 @	
Wood flour	lb.	.01¼@	

Proofed Rayon Fabrics

MEDIUM upholstery fabrics of rayon and cotton in small designs and soft rubber effects are being rubberized as a practical measure of improvement. The rubber not only binds the textile construction and allows good sewing but renders the cloth waterproof.

The use of such fabrics is primarily for the upholstery of automobiles and porch furniture where cool seating is desired for comfort, and waterproof quality is essential for protection of padding and springs.

This line of rubberized fabrics has artistic and practical appeal sufficient to lead several important concerns in the automobile industry to give it extended practical trial, according to the Du Pont Rayon Co.

Egg Stamping Machine

A MACHINE of English design and manufacture was exhibited at the recent World's Poultry Congress, London, England, which candles, grades, weighs, counts, and stamps eggs in one operation at the rate of 3,800 per hour. The machine is run by electricity, and the work even to stamping the name of the shipper and the date on each egg with a rubber stamp is all done automatically. In operation the eggs are taken from the box, candled on a moving rubber belt conveyer. Thence they pass by carriage on a track to successive scales for grading them according to weight from 2 to 2¼ ounces each. When an egg finds its proper grade, it drops off the scale on to a moving rubber belt, which passes it through the counter and the rubber marker. It is then deposited on a tray in its proper grade from which it is packed. *Marking Devices.*

Cotton and Fabrics

WHILE prices have been firm in the cotton market, the ginnings report issued on the fifteenth provided a set-back. At various other times the weakness in corn and wheat and in the stock market, had a depressing influence on cotton, but on the whole it has held its own.

The increased activity reported by textile mills has had a stimulating effect. Mills are taking on more help, and many are running full time. At the same time the Department of Commerce reports that a balance is gradually being made between consumption and production.

The operations of the Farm Board have caused some uneasiness, with some traders of the opinion that the Board has stepped into the market in recent weeks and supported the price of cotton as it has in the case of wheat. The large number of bales held by the Cooperatives is another disturbing element in considering the course of cotton prices, and is constantly recalled when more favorable features are discussed.

If the price of cotton does not advance too high in the next two or three months, hope is held for a substantial reduction of around 15 per cent in cotton acreage for next year. A spur to this movement is the fact that 9,500,000 bales of cotton are now on hand in the world, a total that is larger than any other ever recorded.

Any improvement in the near future will depend largely on improvement in the textile industry; and although increased activity is in evidence, traders are inclined to wait for definite indications that the improvement is permanent.

Week ended November 1. In the first part of the week cotton continued its strong advance, but hedge sales and realizing canceled some of the rise until Saturday, when increased buying again steadied cotton. At the crest of the buying wave May cotton was 12 cents, owing principally to the small amount of cotton that was released by Southern holders. At New Orleans the lessened activity at the close of the week was ascribed to the All Saints Day holiday for which the market there was closed on Saturday.

An active business was reported in dry goods. The gray goods market is also in a strong position, and its volume is greater than for some time past, with mills turning down a large business offered for next year.

The head of the Staple Cotton Association said that the policy of the organization would be to sell this year's crop as rapidly as mills could take the cotton, at full market prices. This policy was based upon the theory that the present depression in values, caused primarily by an oversupply, could not be cured by a holding movement, but that the way to correct the existing conditions was to sell the current crop at the present prices, low as they are, in order to convert raw material into goods and facilitate distribution to consumers at much lower prices than in recent years, as this would remove that part of the carry-over that now constitutes a burdensome surplus.

The government report on crop conditions as of November 1 will be issued next week, and fear as to what the report will show was already in evidence during the latter part of the above period. The estimates of private authorities will also have an unsettling influence on the market, and a good deal of liquidation of long interest and covering of the short is to be expected. Prices at the close on November 1 follow:

Position	High	Low	Close	Previous Close
Dec.	11.16	11.07	11.10	11.13
Dec.	11.17	11.05	11.11/14	11.13/14
Jan.	11.33	11.25	11.26	11.30
Jan.	11.30	11.19	11.25	11.28
Mar.	11.54	11.42	11.50/52	11.52/53
May	11.75	11.65	11.71	11.73/75
July	11.95	11.84	11.91/92	11.93
Oct.	12.14	12.10	12.11	.....

Week ended November 8. Several conflicting factors served to bring irregularity into the cotton market this week, with closing prices about one-quarter cent lower than those in the preceding week. On Thursday prices eased under fresh selling in the face of private crop estimates, and the low point for the day was $4 below the high point of the previous week.

The market was firm before the holiday on Tuesday. But on resuming trading activities stocks and wheat declined sharply, and this decline, together with the private figures that forecast larger ginning and crop figures than was expected, the market in cotton yielded to the pressure.

When the official figures were published, however, they were lower than the trade had anticipated, and cotton was lifted to higher levels. The Department of Agriculture reduced its previous month's estimate 48,000 bales, mainly because of a lower out-turn in Texas and Mississippi. From conditions existing on November 1, cotton production was estimated at 14,438,000 running bales, compared with an estimate of 14,486,000 a month ago, and 14,828,000 ginned last year.

Cotton ginned prior to November 1 from the growth of 1930 was announced by the Census Bureau to have totaled 10,863,601 running bales, including 333,581 round bales, counted as half bales, and 10,461 bales of American-Egyptian. Ginnings to November 1 last year totaled 10,891,940 running bales, including 369,047 round bales, and 10,763 bales of American-Egyptian.

The Cotton Exchange estimated the world's visible supply of all kinds of cotton at 9,131,000 bales, against 7,354,000 a year ago and 6,998,000 two years ago. Of this, American cotton forms 7,271,000 bales, an increase of 1,640,000 from a year ago. Prices at the close on November 8 were:

Position	High	Low	Close	Previous Close
Dec.	11.18	10.90	11.10/14	10.92
Dec.	11.20	10.85	11.10/13	10.92/95
Jan.	11.37	11.08	11.27	11.12
Jan.	11.35	11.00	11.25	11.08
Mar.	11.63	11.25	11.50/51	11.32/35
May	11.88	11.48	11.74/75	11.52/56
July	12.02	11.67	11.88/90	11.75
Oct.	12.22	11.90	12.12	11.97

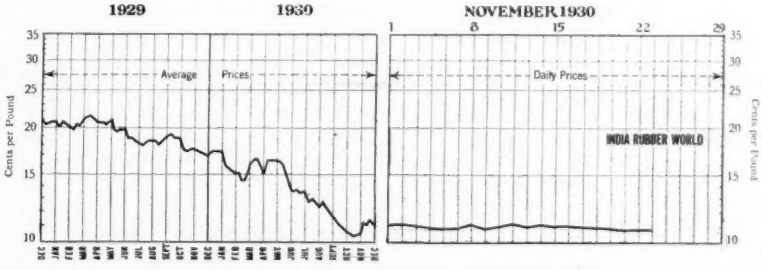
Week ended November 15. While the net change in cotton prices was small, the trend for the week was highly irregular. At New Orleans, Armistice Day is a legal holiday, and the liquidation in advance of the holiday caused a decline which was followed by a strong rally when trade buying again was resumed.

COTTON BULL POINTS

1. Expected improvement in tire demand will increase demand for cotton fabric.
2. Mill operations are definitely expanding.
3. Production of cotton goods was curtailed 1,500,000,000 yards during the first nine months of this year, and stocks are low.
4. Crop report was 14,438,000 bales on November 14.
5. Report of the Association of Cotton Textile Merchants of New York shows sales for October of 146.7 per cent of production; shipments of 118.1 per cent of production; unfilled orders increased 22.9 per cent; and stocks on hand decreased 10.6 per cent.
6. Spindles in the United States during October were operated at 77.1 per cent of capacity on a single shift basis compared with 73.4 per cent for September.
7. Prospects indicate a reduction of 15 per cent in acreage next year.
8. Cotton consumed during October was 444,494 bales of lint, compared with 394,321 in September this year.
9. Imports of foreign cotton during October totaled 1,747 bales, compared with 3,394 bales in September and 19,815 bales in October last year.
10. In the three completed months of the cotton year exports have been 2,273,112 bales, compared with 2,203,194 in the same period last year.
11. Favorable indications of a balance between consumption and production in the textile industry were reported by the Department of Commerce.

COTTON BEAR POINTS

1. Total ginnings prior to November 14 were 11,962,000 running bales, compared with 11,890,000 to the same date last year.
2. Speculation is whether the Farm Board is supporting the price of cotton.
3. The American Cotton Cooperative Association's report issued on November 15 shows that 3,000,000 bales or more are being financed by the Farm Board.
4. The world's visible supply of cotton of all kinds now exceeds 9,500,000 bales, the largest ever recorded.
5. Port stocks are over the 4,000,000-bale mark, as compared with 2,500,000 a year before.
6. Consumption of cotton is low during 1930 as compared with 1929.
7. Domestic mills are well-stocked.



Daily Prices of Spot Middling Upland Cotton

The rainy weather has retarded harvesting the cotton crop in many sections, and it is felt that a bullish ginning total may be expected.

In its monthly report the Association of Cotton Textile Merchants of New York reported a decrease of 41,000,000 yards in stocks of cotton cloth during October, the largest drop registered with the exception of September. Covering reports of a five-week period, sales during October were 146.7 per cent of output; shipments were 118.1 per cent of output; and stocks on hand decreased 10.6 per cent. Current stocks are lower than at any time during the last twelve months; while unfilled orders gained 22.9 per cent.

Domestic consumption for October was reported on Friday by the Census Bureau to have been 444,494 bales, exclusive of linters. This total compared with 394,321 bales of lint in September of this year, and 639,759 bales of lint in October of the preceding year.

The above reports had little influence on the market, but they served to bear out statements that the mills were more active and were feeling the favorable effect of the improved cotton goods markets. It is believed that the returns for November, when they become available, will show a further increase in activity.

The report of the American Cotton Co-operative Association shows that 3,000,000 bales or more are being financed by the Farm Board. Advances last year were on a basis of 16 cents, with 9 cents the level this year.

Prices at the close on November 15 were:

Position	High	Low	Close	Previous Close
Dec.	11.00	10.97	10.96	11.04
Dec.	11.03	10.92	10.95/97	11.00/02
Jan.	11.18	11.18	11.18	11.17
Jan.	11.21	11.10	11.13/14	11.16
Mar.	11.50	11.38	11.43/44	11.45
May	11.75	11.64	11.68/69	11.70/72
July	11.90	11.83	11.86	11.87/88
Oct.	12.10	12.02	12.06	12.05/07

Week ended November 22. The ginnings report issued by the Census Bureau on Friday was higher than was expected, and the market on that day lost from 2 to 9 points. Earlier in the week a severe drop in wheat prices at Winnipeg, reports of bank failures in some of the southern states, and uncertainty as to the development of the policies of the Farm Board, weakened the market. Net change for the week was some 20 points lower on an average. On Saturday it seemed as if most of the liquidation of December contracts had been fairly well finished in advance of "notice day" for the tender of deliveries Monday. It is not expected that the market will be unsettled by this liquidation.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Nov. 1	11.33
Nov. 8	11.02
Nov. 15	11.05
Nov. 22	10.95

The ginnings total was 72,000 bales greater than the total a year ago November 21. In the previous report they were 30,000 behind last year, with the crop estimated to be 400,000 bales under the yield for 1929.

Spinning activities were also reported by the Census Bureau on Thursday. The cotton spinning industry was reported to have operated during October at 77.1 per cent of capacity on a single shift basis, compared with 76.4 per cent during September this year and 108.7 per cent during October last year.

Port stocks passed the 4,000,000-bale mark for the first time this season, compared with 2,500,000 a year before. Certificated stock increased to 948,000 bales. The world's visible supply of all kinds now exceeds 9,500,000 bales, the largest ever recorded.

The firm tone noticeable a week or two ago was lacking during the above week, probably owing to weakness in other markets. Wholesale prices in October declined 2 per cent as compared with September, after maintaining almost a stable position during July, August, and September.

Prices at the close on November 22 follow:

Position	High	Low	Close	Previous Close
Dec.	10.83	10.75	10.75	10.77
Dec.	10.85	10.76	10.76/77	10.78/80
Jan.	11.00	10.93	10.98	10.92
Jan.	11.01	10.93	10.96/97	10.94
Mar.	11.30	11.20	11.22/23	11.19/20
May	11.57	11.46	11.50/51	11.45/46
July	11.74	11.63	11.65/67	11.63/64
Oct.	11.93	11.83	11.84/86	11.83/85

Spot cotton on November 24 was quiet and unchanged at 10.85 cents for middling. Cotton in store is reported running in quality not more than half a grade above or below middling.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. Fabric business of substantial volume for forward delivery was placed during November. Prices for fabrics are becoming gradually firmer under healthier mill inventory position and the improving prospects of steadier demand. Cotton is still relatively higher in price than cotton cloths.

RAINCOAT FABRICS. The fall season for the raincoat trade is practically over and all concerns are making up their new spring lines. At the present time no numbers are outstanding.

SHEETINGS. For the past two or three weeks the market for grey goods has been less active than for a month previous. As far as sheetings are concerned, the demand has been very light, and there is no chance of an advance in prices until some of the stock in the market is moved.

TIRE FABRICS. During the past month demand remained extremely quiet; inquiries were only occasional and for light poundages. Sales were few and far between, and it is impossible to assert that the quotations reported are the market.

New York Quotations

November 24, 1930

Drills

38-inch 2.00-yard	*yard*	$0.11¼@
40-inch 3.47-yard		.07 @
50-inch 1.52-yard		.16 @
52-inch 1.90-yard		.11⅞@
52-inch 2.20-yard		.10½@
52-inch 1.85-yard		.12½@

Ducks

38-inch 2.00-yard D. F.	*yard*	.12 @
40-inch 1.45-yard S. F.		.17 @
72-inch 1.05-yard D. F.		.26 @
72-inch 16.66-ounce		.29 @
72-inch 17.21-ounce		.30½@

MECHANICAL

Hose and belting	*pound*	.26½@

TENNIS

52-inch 1.35 yard	*yard*	.18½@

Hollands

RED SEAL

36-inch	*yard*	.13 @
40-inch		.14 @
50-inch		.19½@

GOLD SEAL

40-inch, No. 72	*yard*	.16½@
40-inch, No. 80		.18 @

Osnaburgs

40-inch 2.35-yard	*yard*	$0.10 @
40-inch 2.48-yard		.09¾@
40-inch 3.00-yard		.08 @
40-inch 10-oz. part waste		.12 @
40-inch 7-oz. part waste		.08½@
37-inch 2.42-yard		.09⅞@

Raincoat Fabrics

COTTON

Bombazine 64 x 60	*yard*	.10 @
Bombazine 60 x 48		.09 @
Plaids 60 x 48		.11 @
Plaids 48 x 48		.10 @
Surface prints 64 x 60		.12 @
Surface prints 60 x 48		.11 @
Print cloth, 38½-in., 60 x 48		.05 @
Print cloth, 38½-in., 64 x 60		.05¼@

Sheetings, 40-inch

48 x 48, 2.50-yard	*yard*	.08½@
48 x 48, 2.85-yard		.07½@
64 x 68, 3.15-yard		.08¾@
56 x 60, 3.60-yard		.07¼@
44 x 48, 3.75-yard		.06¼@
44 x 40, 4.25-yard		.05⅝@

Sheeting, 36-inch

48 x 48, 5.00-yard	*yard*	$0.05 @
44 x 40, 6.15-yard		.04 @

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded	*pound*	.37 @

BUILDER 23/11

Peeler, karded	*pound*	.37 @

BUILDER 10/5

Peeler, karded	*pound*	.34 @

CORD 23/5/3

Peeler, karded	*pound*	.37 @

CORD 23/4/3

Peeler, karded	*pound*	.39 @

CORD 23/3/3

Peeler, karded	*pound*	.42 @

CORD 15/3/5

Peeler, karded	*pound*	.35 @

CORD 13/3/3

Peeler, karded	*pound*	.34 @

LENO BREAKER

8-oz. Peeler, karded	*pound*	.37 @
10-oz. Peeler, karded		.37 @

CHAFER

9.5 oz. Peeler, karded	*pound*	.39 @
12-oz. Peeler, karded		.38 @
14-oz. Peeler, karded		.37 @

Cotton Spirality

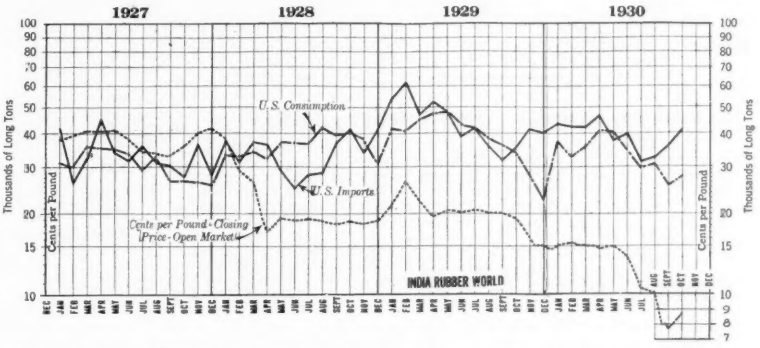
Spirality is the secret of cotton's great textile value, according to Dr. T. H. Kearney, cotton specialist of the United States Department of Agriculture The cotton fiber is round when young, but assumes a spiral form with the collapse of the fiber walls as the plant matures.

Imports, Consumption, and Stocks

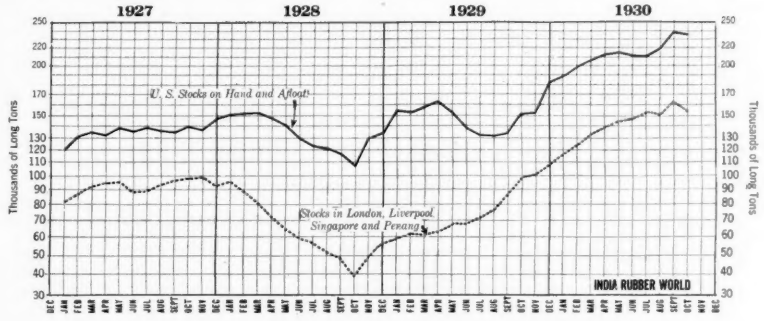
IMPORTATIONS of rubber to the United States for the first four months of this year were from about 6,500 to 8,600 tons in excess of consumption in the same period. Since then the imports have fluctuated widely and with little apparent relation to consumption. Except in May, July, and August they were greatly in excess of consuming demand, being in October more than double the amount of requirements for that month.

In consequence of these conditions, domestic stocks have rapidly risen, reaching in October a total of 236,593 tons and estimated for November at 245,000 tons. Other estimates of crude rubber statistical position for November are: imports, 38,000 tons; consumption, 23,000 tons; afloat to the United States, 50,000 tons; and stocks on hand in the United States, 195,000 tons.

Present tire manufacturing conditions indicate that stocks will be increased still further by December importations, pending the tire demand for new equipment that is due to develop immediately following the January automobile shows.



United States Imports, Consumption and Prices of Ribbed Smoked Sheets



United States, British, and Malayan Rubber Stocks

London, Liverpool, Singapore, and Penang stocks one year ago totaled 99,230 tons. In the twelve months intervening they have advanced to 154,425 tons or an increase of nearly 60 per cent.

The weekly record of London and Liverpool stocks in November, including the week ended the twenty-second, is as follows:

LONDON STOCKS

Week Ended	Tons
Nov. 1	77,480
Nov. 8	75,159
Nov. 15	76,042
Nov. 22	76,448

LIVERPOOL STOCKS

Week Ended	Tons
Nov. 1	38,941
Nov. 8	39,336
Nov. 15	40,003
Nov. 22	40,492

United States Statistics of Rubber Imports, Consumption, and Stocks

Twelve Months	*Net Imports Tons	Consumption Tons	Stocks on Hand Tons	Stocks Afloat Tons	Total Domestic Stocks Tons	British and Malayan Stocks: London & Liverpool Tons	British and Malayan Stocks: Singapore & Penang Tons	British and Malayan Stocks: Total Tons
1925	385,596	388,000	50,985	52,421	103,406	6,328	18,840	25,168
1926	399,972	366,000	72,510	51,238	123,748	51,320	26,443	77,763
1927	403,472	373,000	100,130	47,938	148,068	66,261	25,798	92,059
1928	407,572	437,000	66,166	68,764	134,930	22,603	32,905	55,508
1929	527,327	464,644	105,138	62,389	167,527	73,253	35,548	108,801
1930								
January	44,093	36,669	126,068	61,863	187,931	81,300	33,468	114,768
February	41,373	32,726	134,790	63,404	198,194	87,100	37,550	124,650
March	42,339	35,914	141,843	63,646	205,489	93,500	38,129	131,629
April	46,997	40,207	148,272	63,261	211,533	99,870	39,880	139,750
May	37,790	39,902	146,179	68,168	214,347	102,936	41,253	144,189
June	39,761	34,643	151,551	58,658	210,209	108,203	39,033	147,236
July	30,970	29,245	152,001	58,326	210,327	108,704	45,459	154,163
August	31,643	30,575	158,604	61,168	219,772	112,989	48,132	161,121
September	36,498	25,288	169,927	60,924	230,851	117,962	44,015	161,977
October	41,016	27,271	185,470	51,123	236,593	114,495	39,930	154,425

*Including liquid latex, but not guayule.

United States Crude and Waste Rubber Imports for 1930 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1930	Total 1929	Balata	Miscellaneous	Waste
January ..... tons	46,042	362	747	76	10	125	...	47,362	52,305	127	748	35
February	42,510	275	788	66	14	75	...	43,728	64,538	130	543	144
March	44,002	332	894	37	15	150	...	45,430	53,824	123	738	20
April	48,727	179	881	53	12	75	...	49,927	54,171	87	628	107
May	39,620	444	530	...	1	150	...	40,745	49,180	109	909	87
June	41,631	314	492	...	128	88	...	42,653	44,490	127	829	2
July	33,207	193	489	36	...	159	...	34,084	44,252	104	525	11
August	33,558	621	346	26	7	...	...	34,558	38,292	39	949	30
September	38,304	476	508	27	2	150	...	39,467	32,515	119	748	22
October	42,885	274	526	...	5	39	...	43,729	43,725	72	695	4
Total ten months, 1930 ..... tons	410,486	3,470	6,201	321	194	1,011	...	421,683	.....	1,037	7,312	462
Total ten months, 1929 ..... tons	*466,471	...	9,139	309	334	1,026	13	.....	477,292	814	10,610	2,499

* Latex included.

Compiled from Rubber Manufacturers Association statistics.

Low and High New York Spot Prices

	1930*	November 1929	1928
PLANTATIONS			
Thin latex crepe	$0.08⅝@$0.10	$0.16½@$0.19¼	$0.18⅝@$0.19½
Smoked sheet, ribbed	.08¼@ .09½	.15¾@ .18⅛	.17⅝@ .18¾
PARAS			
Upriver, fine	.12 @ .12¾	.16½@ .19¼	.19 @ .20½
Upriver, coarse	.07 @ .08½	.08¾@ .10½	.13 @ .14½
Upper caucho ball	.07 @ .07¾	.08¼@ .10½	.12 @ .13½

*Figured to November 24, 1930.

London Stocks, September, 1930

LONDON	Landed for Sept. Tons	Delivered for Sept. Tons	Stocks Sept. 30 1930 Tons	1929 Tons	1928 Tons
Plantation	10,067	7,687	83,219	42,041	31,334
Other grades	10	5	52	54	75
LIVERPOOL					
Plantation	†6,691	†1,643	†34,718	†10,026	†2,233
Total tons, London and Liverpool	16,768	9,335	117,989	52,121	33,642

† Official returns from the recognized public warehouses.

World Rubber Shipments—Net Exports

Long Tons

British Malaya	Calendar Years 1928	1929	1930 July	Aug.	Sept.	Oct.
Gross Exports	409,500	579,524	41,347	47,802	48,529	47,770
Imports	149,787	161,612	12,759	10,304	8,087	7,312
Net	259,713	417,912	28,588	37,498	40,442	40,458
Ceylon	57,271	80,795	3,868	7,077	7,966	7,388
India and Burma	10,790	11,720	792	600	343	†
Sarawak	10,087	11,079	1,086	796	680	598
British No. Borneo	6,698	7,381	600	*500	*500	†
Siam	4,813	5,024	327	335	289	247
Java and Madura	58,848	66,010	6,022	5,982	5,960	†
Sumatra E. Coast	82,511	87,589	5,891	7,197	6,658	†
Other N. E. Indies	121,671	134,732	9,770	9,520	7,302	†
French Indo-China	9,616	10,147	805	394	527	†
Amazon Valley	21,129	21,148	810	809	1,093	669
Other America	1,490	996	13	28	*30	†
Mexican Guayule	3,076	1,275	93	50	100	64
Africa	6,124	4,596	264	314	*300	†
Totals	653,837	860,404	58,929	71,100	72,190	.....

* Estimate. † Not available. *Compiled by Rubber Division, Department of Commerce, Washington, D. C.*

World Rubber Absorption—Net Imports

Long Tons

CONSUMPTION	Calendar Years 1928	1929	1930 June	July	Aug.	Sept.
United States	441,400	472,000	37,425	32,785	34,513	34,373
United Kingdom	48,504	72,023	9,645	7,650	8,369	16,015
NET IMPORTS						
Australia	8,430	15,886	67	84	265	‡
Austria	3,043	3,324	423	130	224	158
Belgium	7,958	9,445	691	939	888	824
Canada	30,447	35,453	2,579	3,347	2,108	1,578
Czechoslovakia	3,138	4,650	282	342	450	‡
Denmark	566	799	129	80	143	113
Finland	768	976	56	99	102	139
France	36,498	59,342	4,458	3,311	3,953	‡
Germany	37,855	49,078	3,794	3,449	3,515	4,089
Italy	12,433	17,169	1,382	587	886	1,279
Japan	25,621	34,284	2,677	1,206	2,170	‡
Netherlands	2,243	3,022	343	172	37	221
Norway	728	813	58	30	86	73
Russia	15,134	12,626	1,454	238	*1,500	*2,000
Spain	.....	2,400	*200	*200	*200	*200
Sweden	2,356	3,857	263	547	416	‡
Switzerland	566	653	85	86	63	87
Others estimated†	8,000	.....	.....	.....	.....	.....
Grand totals	685,688	797,800	66,011	55,282	59,888	.....
Minus United States	441,400	472,000	37,425	32,785	34,513	34,373
Total foreign	244,288	325,800	28,586	22,497	25,375	.....

* Estimate to complete table. † Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, Spain, and Union of South Africa. ‡ Not available.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Principal Rubber Stocks

Long Tons

	1930 May	June	July	Aug.	Sept.	Oct.
Malay estates	12,627	22,998	25,814	26,430	26,573	25,663
S. S. dealers	39,861	37,001	38,537	41,513	36,618	34,479
Other Malay dealers	11,587	11,350	12,498	13,052	13,290	12,924
Malayan ports	3,765	4,263	5,998	5,877	6,830	4,734
Totals	67,840	75,612	82,847	86,872	83,311	77,800
London	77,312	80,260	81,048	80,656	83,304	78,050
Liverpool	25,415	27,332	28,291	29,789	35,500	38,900
Totals	102,727	107,592	109,339	110,445	118,804	116,950
United States inventory	151,049	155,000	158,445	162,283	171,285	188,310
Plantation afloat for United States	61,791	59,385	58,989	62,149	64,000	*50,441
Plantation afloat for Europe	22,730	20,920	27,220	30,310	31,000	*30,000
Totals	84,521	80,305	86,209	92,459	95,000	80,441
Grand totals	406,137	418,509	436,840	452,059	468,400	463,501

* Rubber Manufacturers Association statistics raised from 75 to 100%.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Ceylon Rubber Exports

January 1 to August 31, 1930

To:	Tons
United Kingdom	11,469.47
Continent	5,280.65
Other countries in Europe	41.73
Australia	938.45
America	29,811.39
Canada and Newfoundland	2.50
Other countries in America	94.26
Egypt	11.00
Africa	8.15
India	61.82
Japan	228.31
Other countries in Asia	1.29
Total	47,949.02
For the same period last year	49,218.18

Annual Exports, 1922-1929

	Tons
For the year 1929	80,219.25
1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for October, 1930:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

October, 1930

To:	Rubber Tons	Concentrated Latex Tons	Latex Tons	Revertex Tons
United Kingdom	9,556	..	28	2
United States	24,999	37	53	25
Continent of Europe	8,561	69	9	15
British possessions	709	..	..	..
Japan	3,576	..	..	..
Other countries	131	..	..	..
Totals	47,532	106	90	42

Rubber Imports

Actual Imports by Land and Sea

October, 1930

From:	Dry Rubber Tons	Wet Rubber Tons
Sumatra	528	3,179
Dutch Borneo	227	1,532
Java and other Dutch Islands	112	21
Sarawak	585	13
British Borneo	182	23
Burma	67	3
Siam	80	167
French Indo-China	490	15
Other countries	79	9
Totals	2,350	4,962

Lithuania Tire Report

Owing to Soviet dumping methods in Lithuania in selling Krasny-Treugolnik tires, tire prices are becoming more and more unstable. Although most dealers follow the price list of an American make, it has very little bearing on prevailing prices. Every dealer grants a different discount rate. Soviet tire prices are now about 25 to 30 per cent lower than those of other dealers on this market, if discounts are taken into consideration.

United States Statistics

Imports of Crude and Manufactured Rubber

	August, 1930		Eight Months Ended August, 1930	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	79,997,172	$9,666,362	747,521,142	$107,837,588
Liquid latex	2,114,680	253,127	7,943,647	1,258,205
Jelutong or pontianak	1,715,734	168,511	9,214,212	1,002,079
Balata	23,729	5,600	578,260	224,622
Gutta percha	.....	.....	113,210	19,831
Guayule	112,000	14,000	2,088,027	300,861
Siak, scrap and reclaimed	703,507	9,675	7,906,577	112,708
Totals	84,666,822	$10,117,275	775,365,075	$110,755,894
Chicle *Dutiable*	.....	.....	*$8,733,245	*$4,470,252
Chicle, crude *Free*	628,069	$274,353	†2,315,758	†$1,118,896
MANUFACTURED—*Dutiable*				
Tires *number*	1,782	$10,716	5,592	$70,246
Other rubber manufactures	.....	86,855	.....	873,819
Totals	.....	$97,571	.....	$944,065

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	5,280,556	$655,773	51,052,549	$7,652,563
Balata	9,129	2,555	1,097,898	236,136
Gutta percha, rubber substitutes, and scrap	1,260	992	49,164	6,270
Rubber manufactures	.....	5,705	.....	131,966
Totals	.....	$665,025	.....	$8,026,935

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,808,991	$98,218	15,930,381	$949,648
Scrap and old	2,972,127	87,405	34,271,768	1,290,635
Rubberized automobile cloth *sq. yd.*	101,820	50,256	894,019	434,094
Other rubberized piece goods and hospital sheeting *sq. yd.*	104,071	48,850	966,373	412,681
Footwear				
Boots *pairs*	115,584	242,155	505,275	1,135,342
Shoes *pairs*	344,474	375,530	1,248,279	1,331,998
Canvas shoes with rubber soles *pairs*	246,320	129,033	3,009,076	1,975,053
Soles *doz. pairs*	11,311	33,260	80,129	234,832
Heels *doz. pairs*	105,396	73,294	802,270	554,744
Water bottles and fountain syringes *number*	49,239	27,572	253,613	132,346
Gloves *doz. pairs*	7,300	18,502	83,369	210,394
Other druggists' sundries	.....	31,369	.....	219,199
Balloons *gross*	52,631	59,610	477,767	495,534
Toys and balls	.....	12,209	.....	87,876
Bathing caps *doz.*	8,868	20,757	146,825	314,011
Bands	35,517	15,437	406,535	192,206
Erasers	38,518	22,331	347,138	211,074
Hard rubber goods				
Electrical goods	138,352	16,039	882,757	127,717
Other goods	.....	21,768	.....	249,543
Tires				
Truck and bus casings, *number*	53,798	1,028,696	308,414	6,874,377
Other automobile casings, *number*	145,783	1,259,783	1,426,590	12,440,656
Tubes, auto *number*	149,411	239,749	1,128,357	1,903,834
Other casings and tubes, *number*	13,879	38,716	65,670	193,382
Solid tires for automobiles and motor trucks *number*	1,964	68,532	18,673	593,732
Other solid tires	120,890	20,131	1,000,215	171,149
Tire accessories	.....	92,521	.....	921,723
Rubber and friction tape	133,366	34,650	1,032,594	280,823
Belting	283,829	142,842	3,170,393	1,620,297
Hose	507,189	170,135	5,524,098	1,857,019
Packing	176,838	69,976	1,417,366	613,144
Thread	103,939	91,264	1,095,766	1,061,377
Other rubber manufactures	.....	217,181	.....	1,844,010
Totals	.....	$4,857,771	.....	$40,934,450

*Ending June 17, 1930. †Beginning June 18, 1930.

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	September, 1930		September, 1929	
	Pounds	Value	Pounds	Value
Massachusetts	3,665,738	$386,215	2,737,048	$539,717
Buffalo	10,436	1,657	.....	.....
New York	70,661,662	7,636,949	65,980,086	13,057,025
Philadelphia	.....	.....	1,511,613	291,341
Pittsburgh	.....	.....	2,240	583
Maryland	75,880	5,592	838,142	151,173
Georgia	1,125,357	101,508	.....	.....
New Orleans	1,194,720	69,944	.....	.....
Los Angeles	3,047,179	343,864	2,009,516	376,436
San Francisco	192,811	23,572	71,701	17,500
Washington	.....	.....	6,720	1,440
Ohio	.....	.....	4,623,126	901,741
Oregon	11,200	1,275	.....	.....
Colorado	168,000	17,987	203,603	43,664
Totals	80,152,983	$8,588,563	77,983,795	$15,380,620

United Kingdom Statistics

Imports

UNMANUFACTURED Crude Rubber From—	September, 1930		Nine Months Ended September, 1930	
	Pounds	Value	Pounds	Value
Straits Settlements	19,608,200	£383,907	135,506,300	£3,917,888
Federated Malay States	9,433,100	191,197	59,288,300	1,720,191
British India	823,100	15,753	11,166,100	331,074
Ceylon and Dependencies	4,662,000	91,640	27,767,100	773,914
Java and Dutch Borneo	4,560,300	95,396	27,294,100	790,903
Sumatra and other Dutch possessions in Indian Seas	2,093,700	41,555	16,915,300	515,429
Other countries in East Indies and Pacific, not elsewhere specified	415,800	8,418	2,654,200	77,204
Brazil	365,000	8,465	4,103,900	127,142
South and Central America (except Brazil)	21,400	352	143,600	4,071
West Africa				
French West and Equatorial Africa	.....	.....	278,600	7,883
Gold Coast	15,800	291	289,800	8,355
Other parts of West Africa	79,500	1,328	1,286,500	38,317
East Africa, including Madagascar	75,200	1,290	526,800	15,009
Other countries	103,100	2,949	1,854,200	60,788
Totals	42,256,200	£842,541	289,074,800	£8,388,168
Gutta percha and balata	287,300	£13,899	3,276,300	£236,685
Waste and reclaimed rubber	816,200	9,693	7,048,800	85,581
Rubber substitutes	400	6	118,600	2,436
Totals	43,360,100	£866,139	299,518,500	£8,712,870
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£33,243	.....	£276,418
Inner tubes	.....	3,963	.....	52,314
Solid tires	.....	2,804	.....	34,431
Boots and shoes *doz. pairs*	45,355	118,579	1,065,598	1,249,983
Other rubber manufactures	.....	133,593	.....	1,679,400
Totals	.....	£292,182	.....	£3,292,546

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	1,309,000	£10,285	15,991,700	£129,831
Rubber substitutes	35,500	744	382,500	8,134
Totals	1,344,500	£11,029	16,374,200	£137,965
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£280,368	.....	£3,114,812
Inner tubes	.....	40,106	.....	462,643
Solid tires	.....	9,471	.....	68,982
Boots and shoes *doz. pairs*	35,432	39,751	205,100	288,398
Other rubber manufactures	.....	181,482	.....	1,914,021
Totals	.....	£551,178	.....	£5,848,856

Exports—Colonial and Foreign

UNMANUFACTURED Crude Rubber To—				
Russia	.....	£.....	8,118,800	£307,425
Sweden, Norway, and Denmark	192,600	8,011	1,720,300	66,598
Germany	2,846,900	83,627	22,174,400	708,018
Belgium	623,300	17,886	6,094,400	206,352
France	1,819,500	36,953	17,616,700	599,386
Spain	79,000	3,243	688,000	30,798
Italy	142,400	3,470	2,843,400	93,817
Other European countries	401,000	13,292	3,436,700	136,478
United States	135,200	3,507	3,483,100	101,064
Other countries	141,400	5,327	1,196,900	49,837
Totals	6,381,300	£175,316	67,372,700	£2,299,773
Gutta percha and balata	34,600	£2,823	462,900	£39,055
Waste and reclaimed rubber	12,900	195	71,700	1,431
Rubber substitutes	.....	.....	2,900	60
Totals	6,428,800	£178,334	67,910,200	£2,340,319
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£4,420	.....	£55,822
Inner tubes	.....	641	.....	6,325
Solid tires	.....	1	.....	191
Boots and shoes *doz. pairs*	2,489	4,408	19,720	34,592
Other rubber manufactures	.....	6,840	.....	57,801
Totals	.....	£16,310	.....	£154,731

*Motor cars, motorcycles, parts, and accessories were liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes until April 11, 1927, inclusive.

Official Rubber Goods Production Statistics

Tires and Tubes	1930 July	1930 August	1930 September	1929 July	1929 August	1929 September	1928 July	1928 August	1928 September	Cumulative Total from January 1 through Sept. 30 1930	1929	1928
Pneumatic tires:												
Production ....thousands	3,193	3,332	2,692	4,856	4,354	3,568	4,881	5,607	5,101	33,532	46,143	44,284
Stocks, end of month....thousands	9,449	8,678	7,849	11,872	10,669	9,656	8,396	7,539	7,324	.....	.....	.....
Shipments—												
Domestic ....thousands	4,229	3,976	3,360	5,723	5,667	4,330	5,811	6,131	5,191	33,546	44,710	42,945
Export ....thousands	129	164	165	168	217	168	121	179	168	1,612	1,826	1,380
Inner Tubes:												
Production ....thousands	3,151	3,837	3,053	4,634	4,385	4,152	5,009	6,264	5,327	34,182	45,441	46,892
Stocks, end of month....thousands	9,326	8,589	8,052	12,249	10,618	10,068	11,248	10,466	10,158	.....	.....	.....
Shipments—												
Domestic ....thousands	4,594	4,492	3,523	5,993	6,028	4,562	6,469	6,886	5,245	35,204	46,039	45,352
Export ....thousands	90	118	108	91	109	125	83	132	121	1,007	1,176	996
Solid and Cushion:												
Production ....thousands	13	16	14	39	32	28	46	52	43	160	316	399
Stocks, end of month....thousands	101	90	82	129	118	111	152	149	151	.....	.....	.....
Shipments—												
Domestic ....thousands	19	22	22	39	40	34	45	49	42	188	330	373
Export ....thousands	1	1	1	2	3	2	4	5	2	14	22	34
Other Rubber Products												
Rubber-proofed fabrics, production:												
Total ....thous. of yds.	2,940	3,458	6,481	4,260	5,085	5,507	3,447	4,613	4,966	34,176	37,929	29,034
Auto fabrics ....thous. of yds.	608	678	733	1,188	1,349	1,120	763	764	780	8,055	9,067	7,214
All other ....thous. of yds.	917	975	1,064	1,208	1,317	1,324	733	1,251	1,007	9,462	11,455	7,628
Raincoat fabrics ....thous. of yds.	1,415	1,805	4,684	1,864	2,419	3,063	1,951	2,598	3,179	16,659	17,407	14,192
Rubber heels:												
Production ....thous. of pairs	15,117	13,735	14,322	19,315	23,095	21,702	17,620	21,289	21,451	137,415	177,096	178,741
Shipments—												
To shoe manufacturers....thous. of pairs	11,668	8,813	9,244	13,785	14,942	13,645	12,070	11,642	9,207	84,929	110,075	91,292
To repair trade....thous. of pairs	5,053	6,622	6,681	6,337	8,025	7,859	7,372	9,244	9,199	52,210	66,058	71,044
For export ....thous. of pairs	938	780	1,083	794	1,098	1,054	457	729	875	8,536	9,708	7,717
Stocks, end of month....thous. of pairs	36,220	33,226	31,601	44,243	43,960	42,958	49,679	49,511	49,751	.....	.....	.....
Rubber soles:												
Production ....thous. of pairs	2,663	1,473	2,193	1,295	2,948	2,841	3,168	3,641	2,725	22,011	24,594	29,928
Shipments—												
To shoe manufacturers....thous. of pairs	2,627	1,161	1,691	1,372	2,548	2,185	1,897	2,209	1,703	18,779	19,631	17,187
To repair trade....thous. of pairs	364	317	333	163	517	618	808	917	893	3,325	5,399	8,342
For export ....thous. of pairs	34	74	74	70	78	47	55	46	29	516	481	1,918
Stocks, end of month....thous. of pairs	2,876	2,289	2,729	2,895	3,319	3,316	5,067	5,633	5,501	.....	.....	.....
Mechanical rubber goods:												
Shipments—												
Total ....thous. of dolls.	4,910	4,452	4,083	6,306	6,792	5,906	5,157	6,306	5,393	47,541	59,200	52,795
Belting ....thous. of dolls.	1,364	1,248	1,045	1,645	1,940	1,490	1,396	1,888	1,412	11,324	14,418	13,090
Hose ....thous. of dolls.	1,856	1,682	1,473	2,355	2,196	1,964	1,795	2,068	1,731	19,230	21,928	19,772
All other ....thous. of dolls.	1,690	1,622	1,565	2,305	2,656	2,452	1,966	2,360	2,250	16,985	22,855	19,952
Rubber bands, shipments....thous. of lbs.	174	164	172	192	196	189	173	193	186	1,799	1,947	1,719
Rubber flooring, shipments....thous. of sq. ft.	507	559	529	566	598	630	477	583	754	4,936	5,101	5,260
Calendered rubber clothing:												
Production ....no. coats and sundries	38,582	44,952	37,097	89,871	96,281	93,444	59,685	74,509	92,588	538,973	744,720	912,339
Net orders ....no. coats and sundries	28,767	26,348	39,364	60,921	37,906	49,940	37,512	64,695	108,156	484,928	523,363	633,456

Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Tire Production Statistics

	High Pressure Pneumatic Casings: All Types Inventory	All Types Production	All Types Total Shipments	Cord Inventory	Cord Production	Cord Total Shipments
1928	10,217,708	58,457,873	55,721,937	3,580,576	19,302,218	19,351,380
1929	9,470,368	54,980,672	55,515,884	2,290,236	13,765,025	15,016,460
1930						
January	9,539,353	3,588,862	3,525,404	2,382,959	804,783	713,713
February	9,928,838	3,644,606	3,356,104	2,474,495	662,419	599,599
March	10,010,173	3,890,981	3,773,865	2,458,117	572,417	588,613
April	10,461,208	4,518,034	4,071,822	2,493,603	656,281	610,308
May	10,745,389	4,573,895	4,173,177	2,421,953	618,012	677,999
June	10,621,634	4,097,808	4,234,994	2,258,517	584,089	748,203
July	9,449,318	3,193,057	4,357,836	1,835,760	425,844	845,072
August	8,678,164	3,332,489	4,139,900	1,516,904	506,305	869,662
September	7,849,411	2,692,355	3,524,141	1,285,619	521,835	759,366

	Balloon Casings Inventory	Balloon Casings Production	Balloon Casings Total Shipments	Solid and Cushion Tires Inventory	Solid and Cushion Tires Production	Solid and Cushion Tires Total Shipments
1928	6,594,978	38,878,218	35,931,982	152,120	508,223	512,602
1929	7,160,127	41,128,577	40,377,781	122,200	409,344	427,779
1930						
January	7,139,154	2,779,864	2,805,740	126,784	25,049	21,476
February	7,436,247	2,975,922	2,750,324	127,793	22,302	21,005
March	7,535,468	3,311,978	3,177,634	123,179	19,329	23,951
April	7,951,317	3,854,540	3,454,171	116,595	17,335	24,232
May	8,323,436	3,955,883	3,495,178	108,055	16,752	24,426
June	8,363,087	3,513,719	3,486,791	106,589	16,612	19,613
July	7,613,558	2,767,213	3,512,764	100,930	12,893	20,545
August	7,161,260	2,796,184	3,270,238	90,245	16,064	23,519
September	6,563,792	2,170,520	2,764,775	81,692	14,361	23,318

	High Pressure Inner Tubes Inventory	High Pressure Inner Tubes Production	High Pressure Inner Tubes Total Shipments	Balloon Inner Tubes Inventory	Balloon Inner Tubes Production	Balloon Inner Tubes Total Shipments
1928	5,037,716	23,255,891	23,749,966	7,049,748	36,878,990	34,095,223
1929	3,339,451	16,100,281	17,718,806	6,889,213	38,921,749	38,719,177
1930						
January	3,233,813	783,709	889,208	6,911,422	2,898,682	2,992,752
February	3,243,130	675,126	680,989	7,171,395	3,030,745	2,786,578
March	3,137,472	619,416	696,161	7,392,794	3,331,739	3,082,456
April	3,144,558	678,152	674,032	7,871,181	3,728,177	3,202,261
May	2,983,388	683,236	769,463	8,098,115	3,745,131	3,289,384
June	2,781,524	641,508	914,909	8,107,920	3,318,464	3,297,573
July	2,098,130	634,751	1,252,806	7,227,472	2,516,356	3,431,376
August	1,853,988	1,084,265	1,335,284	6,735,316	2,752,615	3,274,572
September	1,715,202	913,190	1,047,783	6,336,919	2,140,234	2,584,675

	Cotton and Rubber Consumption Castings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Cotton and Rubber Consumption Castings, Tubes, Solid and Cushion Tires: Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1928	222,243,398	600,423,401	13,633,452,000
1929	208,824,653	583,039,984	14,748,552,000
1930			
January	14,559,163	42,108,149	1,080,660,000
February	13,766,977	40,378,929	1,060,640,000
March	14,655,987	43,910,926	1,241,240,000
April	17,263,963	51,151,863	1,382,400,000
May	17,436,928	52,130,471	1,459,880,000
June	15,034,336	45,705,967	1,508,220,000
July	13,399,389	39,365,247	1,533,880,000
August	13,222,934	40,735,541	1,497,920,000
September	10,916,524	33,382,031	1,513,200,000

Rubber Manufacturers Association figures representing 80 per cent of the industry with the exception of gasoline consumption.

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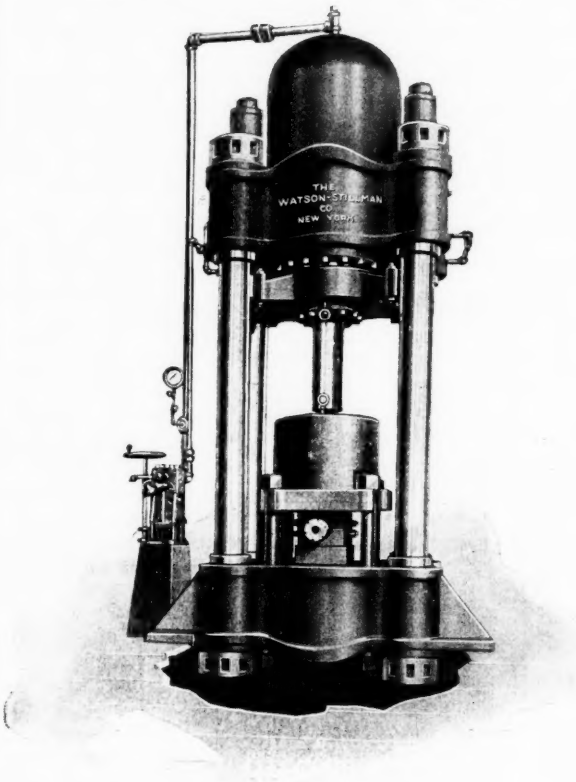

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Dealers' Stocks of Automobile Tires

As of October 1, 1930 [1]

FINAL statistics compiled by the Rubber Division, and here tabulated, show the stocks of automobile casings, inner tubes, and solid and cushion tires held by dealers reporting on October 1, 1930, as compared to October 1, 1929. The final average number of casings per dealer is 62.4, an increase of 2.0 casings over the average in the preliminary report issued on October 14, 1930.

An analysis by volume groups has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of October 1, 1929. This year a greater percentage of reports fell into the classes of dealers having less than 50 casings in stock, a smaller percentage of reports falling into the classes of dealers having more than 50 casings.

The number of dealers reporting stocks of solid cushion tires on October 1, 1930, was 1,443, and the number of such tires on hand was 32,775, an average of 22.7 per dealer. This compares with 1,032 dealers on October 1, 1929, reporting 24,940 tires, or 24.2 tires per dealer.

Dealers were asked to report whether they were handling one, two, three, or more makes of tires. An analysis of the reports shows a greater percentage of dealers concentrating sales efforts on one make than in preceding years. It was disclosed also that dealers handling but one make of tire were holding 70.26 per cent of the total October 1, 1930, stock of casings; those handling two makes, 23.51 per cent; three makes, 4.28 per cent; while all others made up the remaining 1.95 per cent of the total casings inventory.

The following questions were asked all dealers reporting: (1) Do you sell automobiles? (2) Do you sell gasoline? (3) Do you sell batteries? From the 32,611 reports received it was learned that 11,379 dealers, or 34.9 per cent, sell automobiles; 24,294, or 74.5 per cent, sell gasoline; and 21,296, or 65.3 per cent, sell batteries.

A special analysis of dealers handling automobiles shows that less than 30 per cent of the tire dealers handling only one make of tire sell autos, while over 50 per cent of the dealers handling more than one make also sell automobiles.

In the present survey, seven reports were received from chain store organizations, showing total stocks of 473,070 casings and 424,801 inner tubes on October 1, 1930. These figures do not include stocks held by the two principal mail order houses, nor stocks in stores operated by any tire manufacturing companies. No *comparable* statistics are available for previous surveys, but on October 1, 1928, the two principal mail order houses and one of the firms included in the present tabulation reported a total of 615,508 casings and 730,889 inner tubes on hand. These statistics little indicate present *total* stocks in chain stores and mail order houses, but reflect a growing importance of chains in retail tire distribution.

Dealers' Stocks of Automobile Tires

	October 1, 1929			October 1, 1930		
	Number	Dealers Reporting	Average Per Dealer	Number	Dealers Reporting	Average Per Dealer
Total casings	1,739,043	25,417	68.4	1,965,728	31,522	62.4
High pressure casings	459,001	20,045	22.9	341,760	23,584	14.5
Inner tubes	2,592,355	25,079	103.4	2,819,631	31,624	89.2
Solids, etc.	24,940	1,032	24.2	32,775	1,443	22.7

DEALERS' STOCKS OF AUTOMOBILE TIRES BY STATES, OCTOBER 1, 1930

	Total Casings			High Pressure		Inner Tubes		
	No. of Dealers Reporting	No. of Tires on Hand	Average No. Per Dealer	No. of Dealers Reporting	No. of Tires on Hand	No. of Dealers Reporting	No. of Tubes on Hand	Average No. Per Dealer
New England								
Maine	429	17,113	39.9	328	3,583	422	24,677	58.5
New Hampshire	217	11,087	51.1	165	1,973	215	15,338	71.3
Vermont	195	11,462	58.8	144	2,144	196	16,515	84.3
Massachusetts	751	46,764	62.3	513	8,089	767	65,517	85.4
Rhode Island	145	10,397	71.7	100	1,496	151	15,403	102.0
Connecticut	334	23,002	68.9	238	3,587	336	30,665	91.3
Middle Atlantic								
New York	2,135	182,480	85.5	1,536	26,302	2,125	258,663	121.7
New Jersey	695	41,082	59.1	469	5,949	699	62,229	89.0
Pennsylvania	2,726	168,128	61.7	1,878	25,465	2,733	216,945	79.4
East North Central								
Ohio	1,750	97,409	55.7	1,261	16,892	1,760	134,717	76.5
Indiana	962	62,595	65.1	734	10,279	976	91,735	94.0
Illinois	1,603	106,268	66.3	1,235	17,343	1,610	145,810	90.6
Michigan	1,249	64,915	52.0	911	10,430	1,250	98,559	78.8
Wisconsin	1,116	65,229	58.4	878	12,068	1,107	92,469	83.5
West North Central								
Minnesota	884	54,373	61.5	710	11,858	880	78,806	89.6
Iowa	972	54,914	56.5	783	11,187	960	78,677	82.0
Missouri	912	56,553	62.0	713	10,363	912	82,725	90.7
North Dakota	465	19,165	41.2	350	4,125	465	30,897	66.4
South Dakota	382	14,645	38.3	311	3,156	386	23,586	61.1
Nebraska	521	29,509	56.6	430	5,448	522	46,306	88.7
Kansas	810	48,681	60.1	685	10,574	823	75,637	91.9
South Atlantic								
Delaware	55	6,225	113.2	35	1,347	53	7,123	134.4
Maryland	423	30,016	71.0	282	6,371	424	44,180	104.2
Dist. of Columbia	54	7,152	132.4	37	596	54	8,716	161.4
Virginia	831	35,568	42.8	577	6,805	836	51,985	62.2
West Virginia	483	21,875	45.3	324	3,509	481	31,317	65.1
North Carolina	540	31,941	59.2	381	5,832	547	43,711	79.9
South Carolina	314	12,805	40.8	222	2,494	315	24,747	78.6
Georgia	449	27,009	60.2	351	6,177	460	47,037	102.3
Florida	321	29,907	93.2	248	4,850	318	37,132	116.8
East South Central								
Kentucky	416	19,969	48.0	305	3,539	412	31,927	77.5
Tennessee	357	28,896	80.9	269	5,550	362	41,549	114.8
Alabama	360	25,746	71.5	266	3,287	367	37,671	102.6
Mississippi	381	17,643	46.3	278	3,377	386	28,968	75.0
West South Central								
Arkansas	354	18,422	52.0	263	3,020	358	27,804	77.7
Louisiana	286	19,497	68.2	222	4,167	280	30,667	109.5
Oklahoma	489	39,892	81.6	389	5,776	496	54,803	110.5
Texas	1,530	92,036	60.2	1,234	19,128	1,553	155,025	99.8
Mountain								
Montana	303	17,053	56.3	234	2,441	297	24,705	83.2
Idaho	232	12,073	52.0	175	2,062	234	15,640	66.8
Wyoming	117	8,842	75.6	87	906	117	10,721	91.6
Colorado	399	33,318	83.5	311	4,568	407	47,313	116.2
New Mexico	145	7,105	49.0	103	935	148	11,672	78.9
Arizona	189	14,945	79.1	143	2,036	188	21,719	115.5
Utah	198	12,751	64.4	143	1,898	201	16,092	80.1
Nevada	55	2,865	52.1	49	582	54	4,295	79.5
Pacific								
Washington	687	35,057	51.0	514	6,426	688	48,256	70.1
Oregon	390	24,218	62.1	314	4,158	379	30,611	80.8
California	1,792	138,958	77.5	1,387	26,143	1,794	187,021	104.2
Unallocated	119	8,173	68.7	69	1,469	120	11,348	94.6
Total U. S.	31,522	1,965,728	62.4	23,584	341,760	31,624	2,819,631	89.2

[1] Special Circular No. 2482, Rubber Division, United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.